ELECTRONIC DATA INTERCHANGE

EUROPEAN MARKET OPPORTUNITIES

INPUT

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ELECTRONIC DATA INTERCHANGE
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Software and Services Planning Service - Western Europe (SSPS)

Electronic Data Interchange European Market Opportunities

ELECTRONIC DATA INTERCHANGE
EUROPEAN MARKET OPPORTUNITIES

ABSTRACT

Electronic Data Interchange (EDI) is the direct electronic transfer of structured business documents between the computers of independent trading partners. For market analysis purposes, this study focuses on services provided by VANS vendors. VANS have a major role to play by offering users a solution to the communications problems associated with disparate standards for documents, hardware interconnection, software, and complex trading relationships.

EDI offers clear commercial benefits to potential users in terms of enhanced efficiency and profitability. These include administrative cost savings, improved inventory control, cash flow, and customer service.

This report examines the activities of key players in the market. It also analyses issues affecting the development of EDI. Market forecasts and recommendations to participants are included.

This report contains 171 pages, including 34 exhibits.

ELECTRONIC DATA INTERCHANGE
EUROPEAN MARKET OPPORTUNITIES

CONTENTS

ELECTRONIC DATA INTERCHANGE
EUROPEAN MARKET OPPORTUNITIES

EXHIBITS

1 INTRODUCTION

I INTRODUCTION

A. OBJECTIVES AND SCOPE

- This report was produced as part of INPUT's European Software and Services Planning Service Programme (SSPS) and is the result of an extensive study into the evolving marketplace of electronic data interchange (EDI) between independent business entities.

- Although the European market for EDI services is currently at an early stage of development, it is one of the key opportunity areas for value-added network service and software vendors.

- The strategic importance of EDI is reflected in the high levels of interest and commitment to its development shown by government bodies and new organisations across an increasingly broad cross-section of industries.

- INPUT defines EDI as the electronic transfer of structured business documents between the computers of independent trading partners using a telecommunications network.

- INPUT's objectives in conducting this study have been to:

  - Establish an overall view of EDI market potential focusing on the market opportunities for third-party EDI service vendors.

- Examine users' perceptions of the key issues (whether technological, regulatory, or commercial) that are likely to affect its development.

- Examine how EDI is being implemented in several industries and its development among cross-industry trading groups.

- Address the marketing issues that must be considered by vendors of third-party EDI services and provide recommendations for future development.

- This report covers the country markets of France, Italy, the United Kingdom, and West Germany. The term Western Europe is used throughout the report to imply these four individual country markets as a group.

- This study focuses on third-party EDI service markets and excludes consumer applications such as electronic shopping and banking, automatic teller machine (ATM) networks, point of sale (POS), airline reservation, and credit authorization systems which are considered to be captive networks used for transactions between two parties.

- The study excludes private EDI systems (representing transactions without a third party) from the market analysis and forecast, as well as intra-company communications.

- The study also excludes the simple messaging aspects of electronic mail, i.e., messages with an unknown content and format. The precise structure of documents transferred between companies using EDI is known in advance.

- This report has been published as a companion volume to Electronic Data Interchange (U.S. markets) 1985 which analyses trends and issues in U.S. EDI markets. As U.S. markets for EDI services are more well developed than in Western Europe, U.S. experience is highly relevant and of interest to both existing and potential service vendors.

B. METHODOLOGY

- Field research for this report was obtained from an interview programme conducted during June and July 1986 which consisted of:

  - Corporate interviews.

    . Structured interviews were conducted with senior personnel in both the data processing and end-user departments of a wide cross-section of companies.

    . The questionnaire used as the basis of these interviews is included as Appendix C.

  - Vendor interviews.

    . In-depth interviews, the majority being face-to-face discussions, were conducted with 16 representatives of network service and software vendors.

    . The questionnaire used as the basis of these interviews is included as Appendix D.

  - Industry observer interviews.

    . In-depth interviews were also conducted with nine representatives of industry associations, PTTs, and common interest groups.

- Other studies.

  . Research conducted for other INPUT published studies has been used where appropriate to further understanding of the issues and markets discussed.

- An analysis of the research sample is provided as Appendix B.

C. REPORT STRUCTURE

- The remaining chapters of this report are organised in the following way:

  - Chapter II is an Executive Overview providing a summary of the contents of the entire report.

  - Chapter III contains an analysis of the markets for EDI services, including INPUT's assessments of market size and expected growth.

  - Chapter IV analyzes the key issues that impact market development.

  - Chapter V contains a description of services provided by third-party vendors currently active in the market and reviews the major EDI initiatives.

  - Chapter VI analyses areas of market opportunity for service vendors.

  - Chapter VII provides INPUT's conclusions and recommendations for vendors participating or planning to participate in the EDI market.

  - The appendices contain a list of definitions of terms, an analysis of the research sample, the user and vendor survey questionnaires, and a list of related INPUT reports.

II EXECUTIVE OVERVIEW

II EXECUTIVE OVERVIEW

- This Executive Summary is designed in presentation format to help the reader quickly review key research findings and recommendations. It will also provide an executive presentation complete with script to facilitate group communications.

- The key points of the entire report are summarised in Exhibits II-1 through II-6. On the left-hand page facing each exhibit is a script explaining its contents.

A. ELECTRONIC DATA INTERCHANGE

- Electronic data interchange is the electronic transfer of structured business documents between the computers of independent trading partners.

  - Data is transferred via a telecommunications network.

  - The organizations may have incompatible computers and use different communications protocols and data formats.

  - Typical applications are the transfer of electronic invoices, purchase orders, delivery notes, bills of lading, and a myriad of other documents which would otherwise be sent by mail, telex, or even telephone.

- For market analysis purposes, this study focuses on third-party EDI services.

- INPUT's definition excludes consumer-oriented applications such as electronic shopping, Automatic Teller Machine (ATM), Point of Sale (POS), travel reservation, and credit authorisation networks. Intra-company EDI implementations are also excluded.

- The definition also excludes inter-personal electronic mail which consists of messages without a predefined structure.

EXHIBIT II-1

INPUT®

ELECTRONIC DATA INTERCHANGE

The Computer-to-Computer Exchange of Intercompany Business Documents and Information via a Telecommunications Network

B. THE WINDOW OF OPPORTUNITY

- The techniques of electronically transferring data representing standard business documents such as purchase orders and invoices between trading partners have been in use for over 10 years.

- Large companies have established electronic trading links for intra-company communication and have required that smaller, dependent suppliers accept their own defined format or industry standard formats.

- Three developments in recent years have made EDI viable for a much broader range of companies across a wide spectrum of industries.

  - High levels of penetration of computers into businesses processing information used in the buying and selling cycles.

  - Dramatic changes in communications technology which has meant that data communication has become more reliable and simpler to use, and has falling real costs in comparison with other electronic media.

  - The recognition of the need for commonality has led to the development of international document and protocol standards. Despite progress on these standards, there remain many incompatibilities between different equipment types and communications systems.

- The major opportunity for value-added network service vendors is to allow companies to gain the benefits of total systems integration during the time window before international OSI standards and intelligent public networks become well established.

INPUT®

THE WINDOW OF OPPORTUNITY

- Convergent Technology
  - Computers/Communications
- Disparate Standards

C. THE CATALYST TO CHANGE

- Although EDI is still in an introductory phase with innovative users largely going through the testing and pilot phases of development, volume implementation of EDI will appear in the retail, consumer goods manufacturing, automotive, and transportation sectors.

- EDI in these sectors has provided a catalyst to intercompany cooperation. For companies and, indeed, whole industries to survive in an increasingly competitive business environment (both national and international), cooperation is critical to develop competitive advantage.

- EDI leads to significant savings in administrative costs. The reduction in manual interfaces means reduced errors, savings in staff costs, and enhanced productivity.

- The development of rapid, accurate, and close communications between trading partners provides mutual commercial benefits in terms of enhanced efficiency. Faster turnaround facilitates improved inventory control, production scheduling, cash flow, customer service and, ultimately, profitability.

- Smaller companies have yet to recognise the efficiency and trading benefits of EDI which are more important than administrative cost savings. It is important that both user and vendor organisations can educate these potential users to the benefits of EDI.

INPUT®

CATALYST TO CHANGE

- Increasingly Competitive Business Environment
- Clear Commercial Benefits - Profitability
  - Better Customer Service
  - Cost Savings
  - Improved Cash Flow
  - Improved Inventory Control/Production Scheduling
  - Enhanced Management Control
  - Improved Business Relationships

SEDE Jw

D. THE PLAYERS IN THE MARKET

- Value-added network service vendors are now strategically well positioned to take advantage of EDI development by addressing the business problem of increasingly complex cross-industry and trans-border trading relationships.

- VANS are currently providing a range of EDI services which include network management, protocol conversion, format translation, compliance checking, error correction, audit trails, and store and forward mailbox facilities.

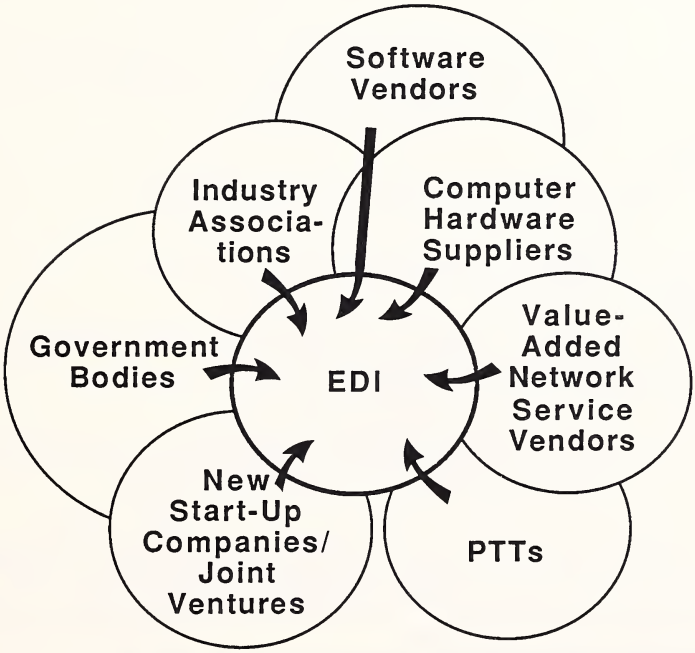
- Participants in the VANS market include ICL International Network Services with Tradanet, the British Telecom and McDonnell Douglas joint venture, EDI-Net, General Electric Information Services (GEISCO) with Motornet and Trade*Express, Istel with Edict, IBM Business Network Services, and McDonnell Douglas Information System International.

- EDI software is provided by the VANS, independent software houses such as Systems Designers PLC, by government bodies such as SITPRO, and large innovative users such as Philips.

- Industry Associations are playing a vital role in establishing standards, specifying systems, and endorsing vendors. EDI is becoming better established in industries where the associations have taken a proactive role in coordinating developments.

- Government bodies such as the European Commission are also taking a proactive role in EDI development through the development of standards and the coordination of EDI projects. Specific EEC projects include the COST 306 initiative in transportation and the CD Project in the customs area.

THE PLAYERS IN THE MARKET



E. EMERGING FROM THE CHRYSALIS: A $170 MILLION MARKET BY 1991

- The European market for third-party EDI services is currently at an embryonic stage of development. EDI usage is restricted to large companies communicating with their larger strategic trading partners.

- INPUT forecasts that the market is poised for significant expansion from 1987 onwards. Its growth will, however, depend on the following factors:

  - The success of specific EDI projects such as ODETTE and DISH which will demonstrate the commercial benefits of EDI to a larger community of smaller companies.

  - Increased liberalisation in PTT Regulations.

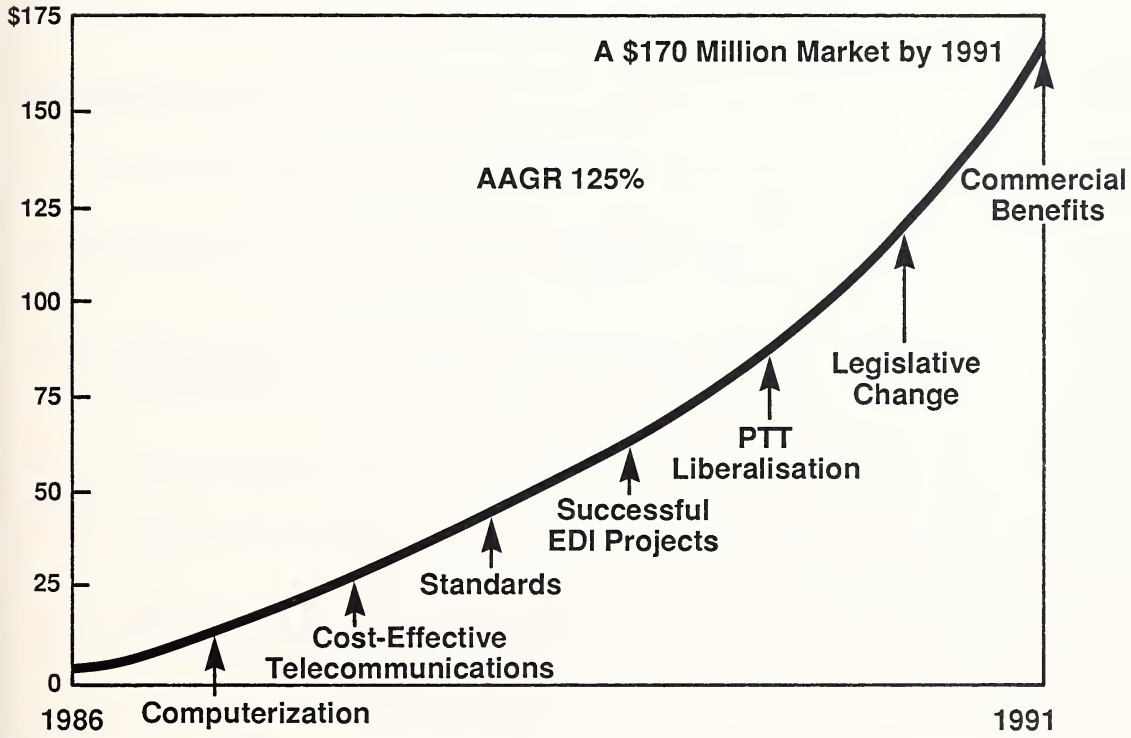
  - Removal of legal constraints.

  - Increased levels of computerisation and the acceptance of micro-computers in small companies.

  - Development of mutually acceptable message standards for a wide range of documents.

- INPUT projects the market for EDI services will grow from an estimated $3 million in 1986 to approximately $170 million by 1991, an average annual growth rate of over 100%.

EMERGING FROM THE CHRYSALIS



F. STRATEGIC DIRECTIONS FOR EDI SERVICE VENDORS

- A joint venture approach and network interlinking will allow VANS vendors to minimise development risk and provide a comprehensive range of services to potential and existing users with cross-industry and international trading links.

- In order to develop this opportunity, current and future participants should:

  - Develop awareness of the benefits of the clearinghouse approach to EDI via conferences and executive seminars targeted at end-user departments, i.e., purchasing, finance, and marketing.

  - Demonstrate the achievability of EDI benefits through low cost trials and pilot schemes.

  - Develop relationships with software houses in order to improve the speed and quality of implementation and provide low-cost packaged turnkey solutions for smaller companies.

  - Provide full EDI implementation and post-implementation support services.

  - Consider unconventional pricing schemes such as flat rates for large companies in order to encourage volume implementation and usage charge only schemes for smaller companies.

  - Provide gateways to interactive databases that use the system transactions for applications such as market analysis and forecasting.

INPUT®

STRATEGIC DIRECTIONS FOR VENDORS

- Joint Venture Approach
- Internetworking Agreements
- Develop Critical Mass of Users
  - Develop Awareness and Achievability of EDI Benefits
  - Use Unconventional Pricing
  - Develop Relationships with Software Houses
  - Provide Full Implementation Support Service

III MARKET OVERVIEW AND FORECAST

III MARKET OVERVIEW AND FORECAST

A. THE EDI CHALLENGE

1. THE BUSINESS PROBLEM

- For many years, companies of all types have been using computers to support business operations. Typically, a company will use a computer system to process and print a variety of documents used in the buying and selling cycles, such as purchase orders, invoices, delivery schedules, shipping instructions, and payment authorisations which are then passed to suppliers, customers, and banks by post, telex, or even telephone.

- Some companies have integrated computer applications for document processing with other internal applications such as order entry, inventory control, materials resource planning, distribution, and decision support systems.

- EDI is, therefore, the logical extension of these developments and seeks to remove the costs and delays inherent in paper-based business document exchange which significantly impacts an organisation's productivity and operational overheads.

- Traditional methods of preparing and managing transaction documents have inherent business problems:

- Paper-based information has to be re-input into a computer for further processing. This leads to transcription errors which can be as high as 30% at the stage of data entry.

- Reliance on postal delivery slows turnaround times.

- Over two-thirds of the costs of processing documents are incurred in handling paper--stationery, printing, postage, data entry, and reconciliation. High costs are incurred in valuable staff time being taken up by handling queries and misunderstandings and checking errors.

- This problem is very pertinent in the area of international trade where there are not just administrative costs in paper handling but also indirect costs resulting from errors and documentation not being available when needed to facilitate the uninterrupted flow of international consignments. In Europe, this problem is compounded with a proliferation of frontiers and national bureaucracy.

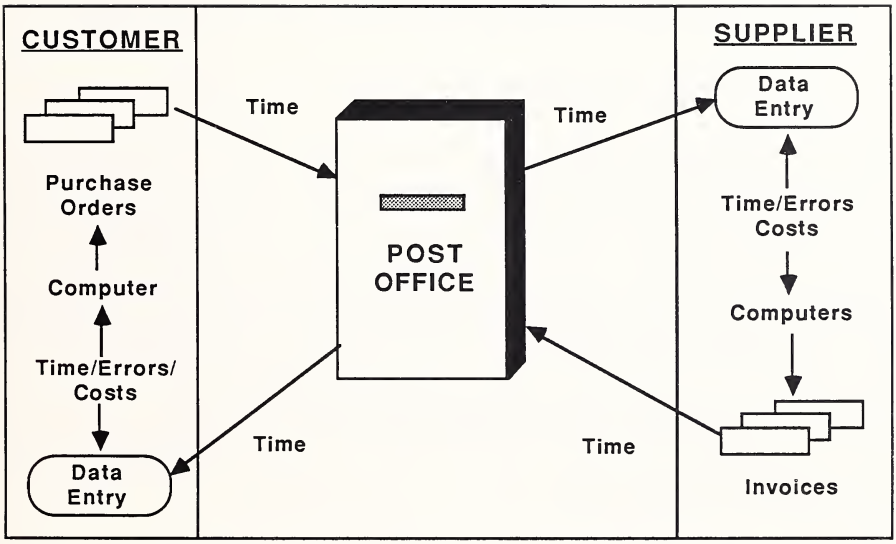
- In addition, slow and inaccurate intercompany communications has meant that companies have invested in excess safety stock. While this guarantees an adequate level of customer service, significant financing costs are incurred which impact on profit levels. This problem is very pertinent in industries where commercial dynamics are geared around rapid turnover of low margin products.

- EDI is now becoming widely accepted as being an exciting innovation in the battle against outdated and inefficient business practices. As one interview respondent suggested 'EDI is never a problem . . . only an opportunity.'

- An illustration of the situation before EDI is given as Exhibit III-1.

EXHIBIT III-1

BEFORE EDI



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2. THE COMMUNICATIONS PROBLEM

- Ideally, these commercial inefficiencies can be resolved by directly linking the computer systems of trading partners. However, this simplistic view of EDI ignores the issues that must be addressed beyond the delivery alternative:

  - Incompatible hardware and communications protocols.

  - Scheduling arrangements for synchronous data transmissions.

  - Incompatible document standards.

- Compounding these problems are complex business arrangements with companies wishing to trade with a variety of trading partners, often across industry sectors.

- The communications problem increases exponentially as the numbers of EDI participants increases.

- These problems are illustrated in Exhibit III-2.

3. THE EDI SOLUTION

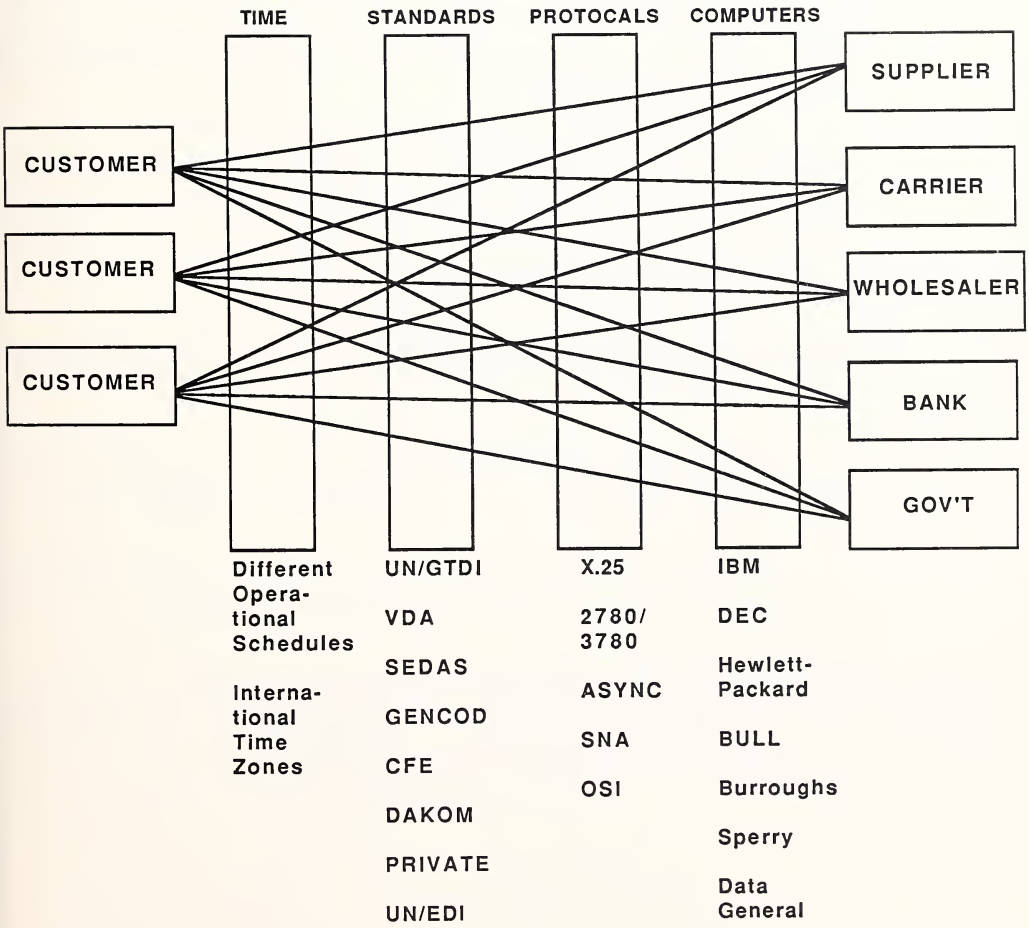
- The overriding commercial objectives of competitive advantage, enhanced business efficiency, and improved profitability have led companies to adopt several alternative solutions to the problems of interlinking corporate computers.

a. Physical Transfer

- Information is transferred between trading partners via the physical transfer of magnetic tapes or diskettes with agreement on standards for document formats and protocols.

EXHIBIT III-2

THE PROBLEM OF COMMUNICATION



- This method is commonly used by companies involved in a retail distribution chain in all European countries.

b. Point-to-Point Connection

- Large companies have implemented EDI with their larger strategic trading partners on a point-to-point or private network EDI system.

- EDI via private networks requires trading partners to accept whatever standards for document formats and communications protocols the company provides, essentially forcing a standard on the supplier with the penalty being a substantial loss of business.

- Companies who have invested heavily in software and personnel to solve the problem in establishing internal communications networks tend to favour this alternative as a solution to external communications for reasons of control, economy, and ease of implementation.

- Proprietary EDI systems based on private networks restrict communication to a few trading partners as:

  - Direct links are only cost justified by high volumes of data and are difficult to maintain.

  - Transmission schedules need to be established and are difficult to manage.

  - Data standards are complex and are constantly being updated over time, thus imposing a heavy amendment burden on participants who need to use common translation software.

c. Clearinghouse Approach

- EDI is being established among communities of trading partners using value-added network service vendors.

- The clearinghouse solution removes the inherent problems of incompatible technical standards and operational schedules that occur amongst different organisations.

- The clearinghouse approach is most suitable for industries with many trading partners and a high volume of transactions that cross industry sector boundaries.

- The clearinghouse approach is also suitable for companies wishing to integrate smaller suppliers into a hybrid network which uses a private network for integrating larger trading partners.

- INPUT suggests that the life of the clearinghouse may well be limited by the timeframe of the development of intelligent public networks and international standards for OSI. These issues will be discussed more fully in Chapter IV of this report.

B. MARKET DEFINITION

1. VALUE-ADDED NETWORK SERVICES (VANS)

- Value-added network service (VANS) vendors can provide the communications links for EDI, either through their own general network and/or by providing gateways to public networks (e.g., PSS, IPSS, TRANSPAC, DATEX-P, or ITAPAC) and other commercial networks.

- VANS also provide a range of processing services which include protocol conversion, format translation, compliance checking, error correction, audit trials, and store and forward mailbox facilities.

- The vast majority of current third-party EDI service usage is batch file transmission using commonly agreed document formats via a mailbox service. This type of service solves the problems of protocol conversion and operating constraints as well as being a low-cost alternative to direct links. It is exemplified by ICL's Tradanet and GEISCO's Motornet services in the U.K.

- More sophisticated EDI services are in place that also facilitate full format conversion and the ability to transmit at the document level rather than batch file transfer.

- In addition, EDI VAN services include reports generated from consolidated transactions. However, the costs of these services are not included in the EDI market forecasts as they are provided at customer request by the service provider and do not directly involve other trading partners.

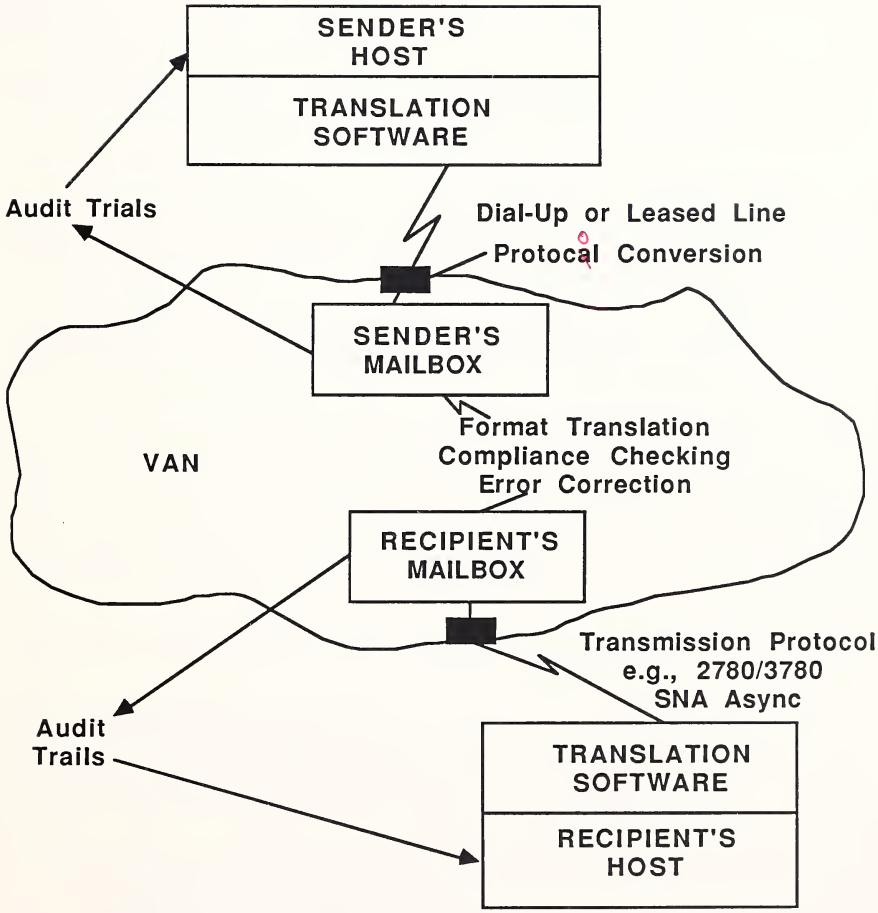
- The major VANS vendors providing EDI services are ICL International Network Services, McDonnell Douglas Information System International, General Electric Information Services Company (GEISCO), ISTEL, IBM Business Network Services, and the British Telecom/McDonnell Douglas joint venture, EDI-Net Ltd.

- Current EDI services provided by VANS vendors are profiled in Chapter V, Section A.

- The role of VANS vendors in EDI is illustrated in Exhibit III-3.

EXHIBIT III-3

THE ROLE OF VANS IN EDI



2. TRANSPORT SERVICES

a. Public Networks

- Enhanced services networks for EDI communications are provided by the respective PTTs in each European country.

- Owing to the highly regulatory nature of the Western European telecommunications environment (with the exception of the U.K.), EDI has been established by innovative users prior to the advent of digital networks (ISDNs) via public packet switching services.

- Revenues from these services have not been included in INPUT's definition since they do not represent an available competitive market for information services companies.

- Principal services in each of the four country markets studies are:

  - France - TRANSPAC.

  - Italy - ITAPAC.

  - U.K. - PSS/Multistream.

  - West Germany - DATEX-P.

- In addition, basic bearer services such as the public switched telephone network (PSTN) are being utilised for EDI.

b. Commercial Networks

- Liberalisation has led to the establishment of independent vendor networks which could also be utilised for basic transport services.

- Examples include Mercury (the Cable and Wireless subsidiary) and the European operations of U.S. networks--Telenet and Infonet.

3. PRIVATE NETWORKS

- Deregulation and technological developments have made it possible to establish economical private data networks.

- Aggregating services on high-speed, high-capacity private links (including satellite and optic fibre networks) offer larger users an alternative to public networks and VANS.

- While complex, multi-drop private networks can become unwieldly, large industry dominant companies often have the resources to implement and manage EDI communications on a private network. EDI champions, such as General Motors via their MAP program, have chosen to adopt this approach.

- In addition to the benefits of control, cost, and speed of implementation, a further factor which can prompt companies to adopt this approach is the slow and time-consuming nature of establishing EDI via agreement through committees. As one respondent remarked, 'A committee is a cul-de-sac down which ideas are channelled and then strangled'.

4. SOFTWARE AND PROFESSIONAL SERVICES

- Users subscribing to a VANS may rely on software hosted on the vendors' processors to perform format conversions, or may internally convert private formats to industry standard formats prior to transmission.

- If developing a private, proprietary EDI network, users can purchase software or write their own. If purchased, customisation by the software vendor, consultants, or the user's development staff is usually required.

- EDI software should be closely linked to existing applications for management reporting and other functions.

- EDI software is available from SITPRO, the BOTB offshoot which offers its Interbridge and Spex II packages on a wide range of hardware. Systems Designers PLC have become endorsed as the prime software vendor for the ODETTE project. Other organisations providing EDI software include large innovative users such as Philips and Volkswagen and a number of small vendors, e.g., GLI in West Germany.

- EDI software company products and strategies are evaluated in Chapter V, Section B, of this report.

- Opportunities also exist for organisations offering professional services which will be required by many users to customise EDI software and to provide system integration skills; for example, the integration of EDI with computer integrated manufacturing.

5. OTHER THIRD-PARTY EDI APPLICATION SERVICES

- VANS vendors have recognised the need to focus their marketing initiatives by entering into agreements and partnerships with software houses and leading players in key emergent industry sectors.

- Distribution deals with third-party vendors allow VANS to demonstrate their ability to support user communities at a commercial applications level as well as reducing their direct marketing costs in an embryonic market.

- An example of a third-party EDI application service vendor is the First National Bank of Chicago which resells GEISCO's Trade Express and Sitpro's Spex II products as part of its Accelerated Trade Payments system.

C. MARKET FORECAST

1. FORECAST DEFINITION

- The market assessment and forecast growth that follow were developed from an assessment of current and projected activities within the market definition described above.

- The forecast covers the period 1986 to 1991 and assesses end-user expenditures. Forecasts are made in local currency and converted into U.S. dollars for aggregation and comparative purposes.

- The forecasts include assumptions about the rate of inflation in each country as follows:

  - France - 4%.
  - Italy - 6%.
  - U.K. - 5%.
  - West Germany - 1.5%.

- In order to maintain a fair comparison between the different country markets throughout the five-year forecast period, the U.S. dollar conversion rates used have been adjusted to reflect the assumed differences in inflation rates.

- U.S. inflation was assumed to be 3.5%.

- Exhibit III-4 sets out the assumed conversion rates used in preparing this forecast.

EXHIBIT III-4

U.S. DOLLAR CONVERSION RATE ASSUMPTIONS

CURRENCY	ASSUMED U.S. DOLLAR CONVERSION RATE					
	1986	1987	1988	1989	1990	1991
French Francs	6.99	7.02	7.06	7.10	7.13	7.16
Italian Lira	1,492	1,529	1,567	1,606	1,646	1,688
Pounds Sterling (£)	0.65	0.66	0.67	0.68	0.69	0.70
Deutsche Marks	2.18	2.14	2.09	2.04	2.00	1.97

- In no regard should these conversion rates be interpreted as a forecast of exchange rates. They are calculated on the basis of prevailing exchange rates and used simply as an index to eradicate distortions that would otherwise arise as a result of the use of different inflation rate assumptions for different countries.

2. FACTORS INFLUENCING SIZE AND GROWTH

- INPUT has used a theoretical model based on evaluation of companies implementing EDI in Western Europe and North America as an 'aide memoire' in evaluating EDI markets.

- The stages of development in EDI implementation are as follows:

  - Stage 1 - Computerisation--Paper-Based Document Interchange.
  - Stage 2 - EDI Champion Emerges.
  - Stage 3 - Study Group Proposals.
  - Stage 4 - Selection of Trading Partners.
  - State 5 - Run Pilot Scheme.
  - Stage 6 - Senior Management Directive.
  - Stage 7 - Integrate Internal Procedures.
  - Stage 8 - Full-Scale Operations.
  - State 9 - Extension to Many Partners.
  - Stage 10 - Include Secondary Documents.

- Timescales involved in these development stages are typically no less than 2 years for stages 1 through 5 and no less than 5 years for stages 1 through 9.

- EDI presents a considerable management challenge not only in terms of its internal implementation but also in terms of external coordination via committees of trading partners, government, and regulatory bodies to establish standards and common procedures for implementation.

- Establishing EDI within a company and/or a user community is, therefore, a time-consuming and lengthy process.

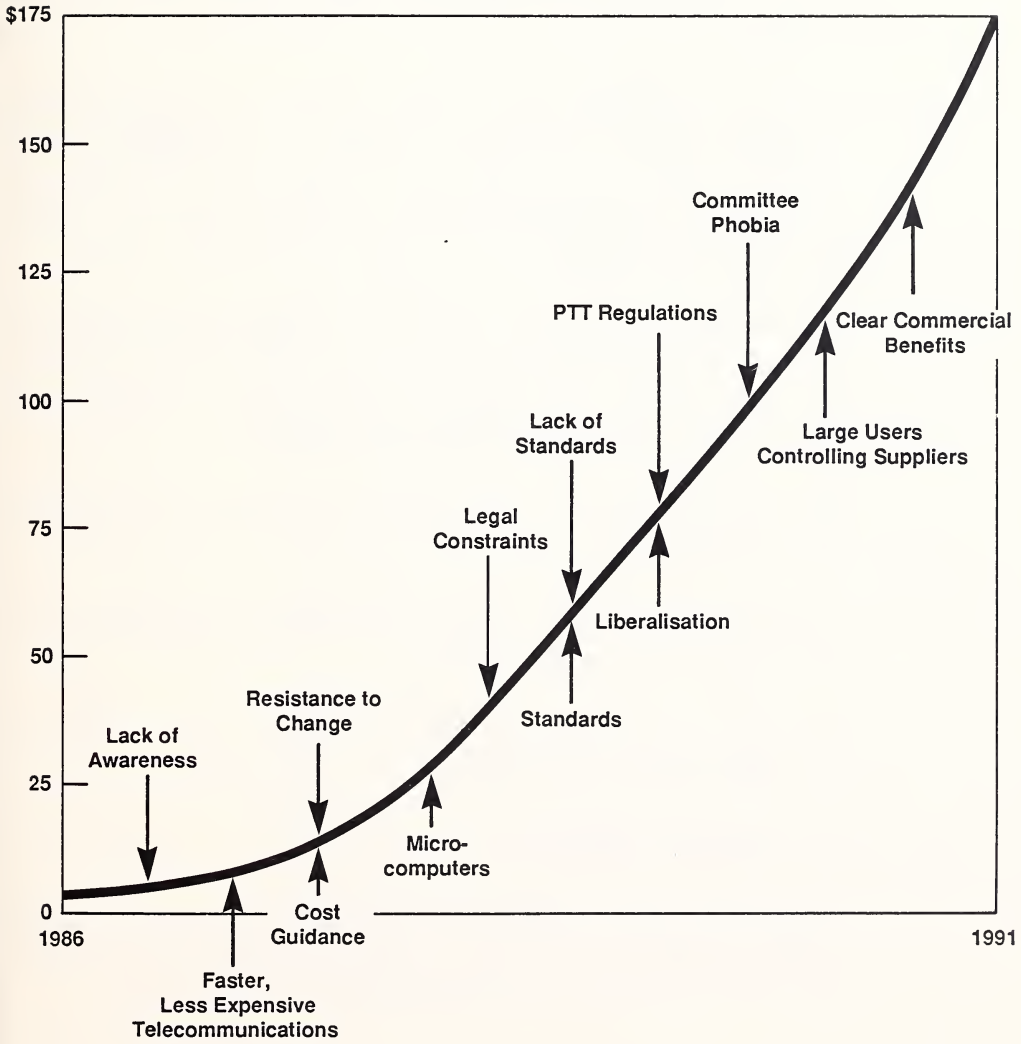
- The current status of EDI can best be generalised as in the piloting or testing phase, i.e., stage 5 in the model. Even in the most advanced market segments, such as retail distribution, participants have only implemented a limited number of transaction types with a small number of trading partners.

- However, INPUT believes that there will be significant growth over the forecast period, with full implementation by the majority of companies now at the pilot stage by 1991.

- There is a confluence of factors which indicate that the EDI market is poised to enter a take-off period. These factors include the proliferation of computer systems, cost-effective telecommunications, the acceptance of industry and international standards, liberalisation in PTT regulations, and the growing awareness of the clear commercial benefits of EDI.

- The factors that are driving or inhibiting the growth of EDI are shown in Exhibit III-5.

FACTORS AFFECTING MARKET GROWTH



3. MARKET FORECAST

a. Overall Growth

- There are a vast range of factors--commercial, technical, human, legal, political, and institutional--that will affect the development of the market for EDI services.

- In assessing these factors, INPUT considers it important to stress the tentative nature of the forecasts developed for these markets through 1991. In consequence, they have been presented in the form of a low (pessimistic), mid-point, and high (optimistic) forecast for each of the four major country markets of Western Europe.

- INPUT forecasts that the market for EDI services will grow from around $3 million in 1986 to potentially $170 million in 1991 based around the medium or most likely scenario. The pessimistic scenario predicts a market of $120 million by 1991, and the optimistic scenario, $220 million.

- These forecasts represent an annual average growth rate of 125% during the five-year period in 1991.

- These forecasts and those for each of the four country markets shown in U.S. currency are summarised in Exhibit III-6.

- Forecasts for each of the country markets (shown in local currency) are summarised in Exhibits III-7 to III-10.

b. Industry Sector Growth

- Although EDI is still in an introductory phase, volume implementation of EDI is appearing initially in the retail distribution and consumer goods manufacturing sectors, followed by the automotive and transportation sectors.

EXHIBIT III-6

COMPARISON OF EDI SERVICE MARKETS BY COUNTRY, 1986-1991

MARKET SUBSECTOR		$ MILLIONS						AAGR 1986-1991
		1986	1987	1988	1989	1990	1991	
United Kingdom	L	$ 1.8	3.6	9.0	18.0	35.0	57	
	M	2.3	4.5	11.0	22.0	43.0	71	100%
	H	2.8	5.5	15.0	29.0	58.0	93	
France	L	0.3	0.6	1.4	3.5	8.0	25	
	M	0.4	0.8	2.1	6.0	14.0	42	150%
	H	0.6	1.1	2.8	8.0	20.0	59	
West Germany	L	0.1	0.2	0.5	1.5	6.0	25	
	M	0.15	0.3	0.7	2.5	10.0	35	200%
	H	0.2	0.4	1.0	4.0	15.0	45	
Italy	L	-	0.1	0.3	0.9	3.5	12	
	M	-	0.15	0.4	1.2	5.0	18	230%**
	H	-	0.2	0.5	1.5	6.0	24	
Total	L	2.0	4.0	12.0	24.0	53.0	120	
	M	3.0	6.0	15.0	32.0	72.0	170	125%
	H	4.0	8.0	20.0	43.0	100.0	220	

* L = Low, M = Mid Point, H = High Estimate

** AAGR: 1987-1991

EXHIBIT III-7

MARKET FORECAST FOR EDI SERVICES
UNITED KINGDOM
1986-1991

	£ Millions						AAGR 1986-1991
	1986	1987	1988	1989	1990	1991	
Low	1.2	2.4	6.0	12	24	40	
Medium	1.5	3.0	7.5	15	30	50	100%
High	1.8	3.6	10.0	20	40	65	

EXHIBIT III-8

MARKET FORECAST FOR EDI SERVICES
FRANCE
1986-1991

	ff Millions						AAGR 1986-1991
	1986	1987	1988	1989	1990	1991	
Low	2	4	10	25	60	180	
Medium	3	6	15	40	100	300	150%
High	4	8	20	55	140	420	

EXHIBIT III-9

MARKET FORECAST FOR EDI SERVICES
WEST GERMANY
1986-1991

	DM Millions						AAGR 1986-1991
	1986	1987	1988	1989	1990	1991	
Low	0.2	0.4	1.0	3	12	50	
Medium	0.3	0.6	1.5	5	20	70	200%
High	0.4	0.8	2.0	8	30	90	

MARKET FORECAST FOR EDI SERVICES
ITALY
1986-1991

	Lira Millions						AAGR 1987-1991
	1986	1987	1988	1989	1990	1991	
Low	-	200	500	1,500	6,000	20,000	
Medium	-	250	650	2,000	8,000	30,000	230%
High	-	300	750	2,500	10,000	40,000	

- Other emergent sectors with potential for rapid growth include financial services, electronics, pharmaceuticals, chemicals, and aerospace.

c. Country Market Growth

- The U.K. has emerged as the most important European market for EDI services and is expected to show significant growth (AAGR 100%) over the forecast period. This is a consequence of several important influences aiding market development as follows:

  - The U.K. offers the most open market with respect to PTT regulations, and liberalisation has encouraged value-added network service vendors to exploit EDI opportunities.

  - EDI standards are more highly developed at an application level in the U.K. than any other country in the world. For example, the Tradacom standards, initially developed by the Article Number Association (ANA) for the retail trade, are now used by a wide variety of industry sectors including manufacturing, transportation, health, public utilities, local authorities, etc. This contrasts to the U.S. where different industry sectors use different standard formats.

  - Industry Associations, such as the ANA and the Society of Motor Manufacturers and Traders (SMMT), have been an important catalyst to U.K. EDI developments by establishing standards, endorsing third-party vendors, and coordinating development projects.

- INPUT expects France to emerge as the second most important market for EDI services.

- The DGT is committed to gradual liberalisation in the area of data communications and is encouraging the development of joint ventures to exploit EDI opportunities.

- EDI is beginning to emerge in the French banking and retail distribution areas.

- With government backing, INPUT believes that the French market is poised for significant growth (AAGR 150%) from 1988 onwards. However, INPUT's research revealed a very high lack of awareness of EDI by French companies, and this will doubtless become an important 'lag' factor in market development.

- French EDI development is also hampered by legislation which requires electronic documents to be accompanied by corresponding paper documents. The 1980 Finance Act did away with this requirement in the U.K.

- Similarly, although characterised by lack of awareness to both the concept of EDI and its benefits, the Italian market is expected to experience explosive growth from the period 1988 onwards (AAGR 230%).

- The West German market, although characterised by a high level of awareness of EDI, is restricted by the highly regulated nature of the telecommunications environment.

- Although there is evidence of moves towards liberalisation in France and Italy, the position is less clear in West Germany with the Bundespost making no legal distinction between basic bearer services and value-added network services--both are public utilities.

- However, EDI clearinghouse services are beginning to emerge in West Germany in the retail distribution sector which use gateways into the Datex-P network. INPUT's forecast assumes gradual liberalisation, especially after the current commission into telecommunications reports after the federal elections in Autumn 1987.

- EDI involves consideration of a variety of issues that impact on market development, including standards, user awareness, industry associations, pricing, and PTT regulations; all are discussed in the next chapter.

IV MARKET DEVELOPMENT - THE ISSUES

IV MARKET DEVELOPMENT - THE ISSUES

A. EDI STANDARDS

- The success of EDI hinges on the adoption of uniform standards that make it possible for computers in different companies to easily read business documents sent electronically between them.

- An EDI standard requires two basic components--a syntax and a data element dictionary. The first is the equivalent of grammar in a language, the second vocabulary. When the two components are combined into a structured and agreed electronic message, paperless trading becomes possible.

- In Europe, the UN/GTDI standards have emerged as a generic international standard and have evolved from the TDI (Trade Data Interchange) syntax rules and TDED (Trade Data Element Directory) developed by the U.K. trade facilitation agency, SITPRO, and endorsed by the UN/ECE in March 1985.

- GTDI syntax rules have been used as the basis for the development of a number of industry and cross-industry EDI standards.

- For the ODETTE project, the U.N. guidelines allowed participants to establish a standard that was non-nationalistic, easy to implement, and translatable. The ODETTE working parties have now implemented three messages (dispatch advice/delivery instruction/invoice), and eight more are planned for the end of 1987.

- In the U.K., the Article Number Association (ANA) first published their TRADACOMS standards based on TDI guidelines in 1982, and they are now used by over 250 organisations across a broad cross-section of industry groupings.

- Coordinating developments in international standards is the UN-JEDI Committee (the UN/ECE WP4 Joint Electronic Data Interchange Working Group). The committee has established agreement on a common universal EDI standard through the harmonisation of the American X.12 series with the European TDI standards. This universal standard was endorsed by the UN/ECE in September 1986, and messages are being developed.

- The introduction of the Single Administrative Document (SAD) in 1988 to substitute the 70 or so currently used for cross-border trade will facilitate the development of EDI, especially in the customs area.

- Standards development across Europe has been fragmented owing to cultural barriers and the political problem of vested national interests. Organisations involved in determining standards have limited authority to control developments and act on a consultative basis only.

- Consequently, there has been a lack of common support for the UN/GTDI standards. This has led to the development of standards at a national level around a narrow industry focus and has tended to create artificial boundaries around trading sectors. Examples of these types of standards include the SEDAS, GENCOD, and DAKCOM standards used in the retail distribution sector in West Germany, France, and Sweden, respectively.

- In addition, private EDI standards have been established by dominant companies in several industries which very rarely have elements in common with the other standards. For example, Ford U.K. handles 10% of its invoices electronically using its own messaging formats.

- Vendors interviewed universally rated the standards issue as a major inhibiting factor in the development of EDI, and many pointed to the need for the development of international and cross-industry standards.

- Several vendors noted that disparate standards provided a major opportunity for VANS by alleviating users of the heavy amendment burden imposed by evolving data standards even after the initial problem of establishing message formats has been overcome.

- Users interviewed in the retail distribution and automotive sectors rated the standards issue as being of little importance. This is due to the presence of established industry standards, TRADACOMS and ODETTE, respectively.

- Users who have established their own standards expressed low concern over this issue.

- Users in other industries such as electronics, transportation, chemicals, pharmaceuticals, and public sector organisations rated their concern as high and pointed to the need for industry and cross-industry standards.

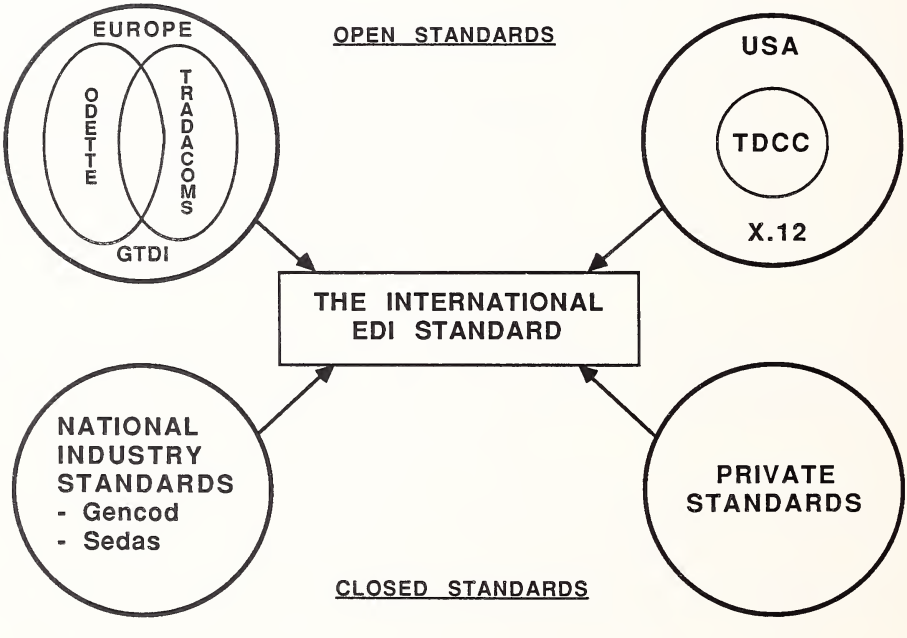
- One of the problems facing those involved with establishing standards is that often multiple parties have requirements which must be accommodated, with decisions being made in a committee environment. The resolution of the problems associated with standardising trade procedures, defining messages, and then agreeing message formats involves a lengthy, time-consuming and, to some participants, unacceptable process.

- The fragmented nature of EDI standards development and the need for harmonisation is illustrated in Exhibit IV-1.

- In addition to the problems of user-driven document standards, there is the additional issue of disparate and evolving standards for telecommunications, hardware intercommunication, and computer software.

EXHIBIT IV-1

EDI STANDARDS - FRAGMENTED DEVELOPMENT



Incompatiability exists at inter-company, inter-industry, and international levels

- EDI development is being facilitated by moves by the world's largest computer manufacturers (IBM excluded) to unite behind the use of the OSI 7-layer model in developing a common standard. The European Commission has endorsed the initiatives of the Standards Promotion and Awareness Group (SPAG) which includes ICL, Siemens, and Bull and the work of the Communications Networking for Manufacturing Applications Group (CNMA). These European groups cooperate with the American Corporation for Open Systems (COS) which includes AT&T, DEC, HP, and Wang as members.

- IBM (although participating in some of the OSI working parties) is still promoting proprietary SNA network solutions, and considerable anxiety exists amongst users, vendors, and governments that adoption of SNA networks for EDI will allow IBM to dominate the market and potentially constrain its future development. IBM already has a 60% share of the European hardware market.

- Members of the ODETTE group have taken a pragmatic approach to the transmission standards problem by recommending the use of the de facto X.25 standard to the 50 or 60 companies now trialling EDI as part of the cross-European project. FTAM will be the recommended solution to levels four to seven of the model when released in 1987.

- At a European level there is a strong need for harmonisation of standards to encourage volume implementation of EDI. As one user suggested '. . . standards should be adopted such that all industries can communicate effectively, whatever the document type, computer system, or industry sector'--a pipedream, perhaps.

B. INDUSTRY ASSOCIATIONS

- For EDI to develop, there is a strong need for commitment to action among a community of trading partners.

- Industry associations are playing a vital role in the growth of EDI through the development of standards, selection and endorsement of vendor services, and the promotion of both the concept and benefits of EDI services among their members.

- As EDI requires the cooperation and agreement of competing players in an industry, the industry association adds legitimacy to standards and EDI service development by virtue of its impartial role as a source of advice and as a forum to discuss and develop industry initiatives.

- It is noticeable that EDI is more well developed in industries where the associations have taken a proactive role in its development; for example, retail distribution.

- EDI is least well developed in industries where the associations adopt their traditionally defensive role, are not present, or are only allied with a limited section of the industry. For example, there has been strong interest in EDI in the electronics sector, but weak industry associations have not provided the necessary catalyst for cooperation and change.

- Industry associations, however, do not have the authority to ensure commitment that encourages success in EDI. EDI initiatives have succeeded in industries where there are major underlying commercial factors that necessitate cooperation among the leading players.

- Cooperation in the ODETTE project arises from strong common interest in cutting costs and the drive towards JIT Inventory in order to counter the threat of Japanese competition.

- In the aerospace industry, the joint venture approach has been necessitated by the need of the airframe manufacturers to cooperate in transnational projects such as the European Airbus. EDI is being established in this industry with the association, the AECMA, playing a coordinating role.

- Similarly, initiatives in the banking sector are being driven by the catalyst of intense competition at national and especially international levels.

- The majority of vendors rated the impact of this issue on market development as high. Their feelings are summed up by the following statements:

  - 'It is vital that we develop relationships with industry associations in order to demonstrate our ability to support the user community'.

  - 'The endorsement of the industry association provided the necessary impetus for growth'.

- There is also a need for vendors to take the initiative in coordinating leading players and developing standards in sectors were there is not an active association. By actively participating in these sectors, vendors can ensure their success by effectively becoming the industry champion for EDI.

- Users interviewed that are currently using EDI placed high emphasis on the role of the associations in developing and maintaining standards.

- Users interviewed that were not involved in EDI rated the importance of support from an industry association as a factor in their lack of use of EDI as low or irrelevant.

- The list of industry associations involved in EDI is given as Exhibit IV-2.

EXHIBIT IV-2

INDUSTRY ASSOCIATIONS INVOLVED IN EDI

RETAIL DISTRIBUTION

- Article Numbering Association (A.N.A.)
  6, Catherine Street
  London WC2B 5JJ (1) 836-2460

- GENCOD (France) 331-828-63545

- CCG (W. Germany) 49221-57-4902

AEROSPACE

Association Europeane des Contructors de Material Aerospatial (A.E.C.M.A.)
Paris (1) 45.63.82.85

CHEMICALS

Conseil Europeane des Industries Chimiques (CEFIC)
Avenue Louise 250.8.5
1050 Brussels
Belgium (32.2.) 6402095

AUTOMOTIVE (ODETTE)

Society of Motor Manufacturers and Traders (SMMT) (U.K.)
Forbes Home
Halin Street
London SW1X 70X (1)235-7000

Groupement pour L'Amelioration des Liasons dans l'Industrie Automodile (G.A.L.I.A.) (France)
Paris (1) 48.25.93.95

- The activities of industry associations such as ODETTE, AECMA, and the ANA are discussed more fully in Chapter V of this report.

C. USER AWARENESS

- Large user organisations interviewed by INPUT in the U.K. and West Germany revealed high levels of awareness of both the concept and benefits of EDI.

- In the U.K., there is a low level of awareness of the potential VANS solution to EDI among non-participating organisations.

- In West Germany, there is a low level of awareness of the potential VANS solution even among participating users. This is a consequence of the lack of available third-party network services in a highly regulated PTT environment.

- Research among French user organisations revealed very low levels of awareness of even the concept of EDI across a broad cross-section of industries.

- The current status of the French market on this issue is summed up by one vendor who remarked that '. . . even those large users who are aware of the need for EDI have the philosophy of developing internally rather than via a third-party network'.

- Smaller organisations interviewed in these markets revealed low levels of awareness both of the concept and commercial benefits of EDI.

- The majority of vendors interviewed rated this issue as being a major inhibiting factor in the development of the market.

- Consequently, it is vital that vendors undertake missionary marketing initiatives during the introductory phase of a market's development.

- Potential EDI users should be educated in the benefits of its implementation and the VANS solution via industry seminars, conferences, and public relations activities.

- The user research among participating and non-participating companies revealed that senior management support was essential to EDI implementation, owing to the need to involve members from a number of departments within an organisation. INPUT suggests that missionary marketing initiatives are targeted at commercial management, i.e., purchasing, finance, and marketing.

- In addition, there is also a need to educate potential users of the impact and organisational requirements for implementing EDI in operational terms.

- There is a need for vendors to approach EDI from the perspective of meeting the needs of groups of trading partners.

- Vendors should stress the business development benefits that can add value to the organisation which in turn is likely to break down user resistance to new communications-oriented methods of doing business.

- Consequently, potential benefits such as those listed below should be of key importance when marketing EDI:

  - Improved profitability.

  - Increased management control.

  - Improved customer service.

  - Competitive advantage.

D. PTT REGULATIONS

- U.K. vendors rated their concern over this issue in the low/medium categories, the U.K. telecommunications environment being the most liberalised in Western Europe and presenting little or no restriction on the development of EDI services.

- However, the liberalised environment has seen British Telecom make aggressive marketing moves in the area of EDI by forming a joint venture company with McDonnell Douglas, EDI-Net Ltd. Further British Telecom initiatives in this area include the development of X.400 enhanced message handling systems.

- The French DGT has announced moves in the direction of liberalisation after the enactment of the first deregulation law in July 1986. Deregulation has concentrated on the area of data communications and offers the opportunity for VANS to offer more widely ranging facilities than existing services such as electronic mail, subject to the authorisation of the DGT.

- The policy of the DGT would appear to be that it does not intend to compete directly with VANS vendors. The future role of the DGT will be to act as a carrier or bearer service, i.e., apparently giving carte blanche to software companies and VANS suppliers.

- CIGREF (Club Informatique des Grandes Enterprises Francais), the user group representing over 50 of the largest French companies, expressed strong concern that if liberalisation on the lines of the U.K. model progressed too quickly, a former PTT monopoly would be replaced by an IBM monopoly. IBM has already formed a consortium with bank Paribas and software house Sema Metra with the objective of optimising future usage of their proprietary SNA products.

- The DGT has also received proposals for new VANS offerings from a joint venture of Olivetti and Compagnie Financiere de Suez and also from General Electric Information Services linked with hardware manufacturer Bull. It is expected that McDonnell Douglas International Information Systems will begin to offer EDI services in France during 1987.

- The regulatory environment in France can be summed up by the comment of one vendor. 'The PTT can inhibit or positively promote the use of EDI. If EDI is regarded as a value-added network service, the PTT will not address the issue above the provision of the Transpac network service'.

- One French vendor, however, rated this issue of crucial importance. 'There are enormous barriers; I do not think it will change at all'.

- Although West Germany would appear to be the most highly regulated of the four European markets, it would appear that EDI is developing despite the regulations.

- The current attitude expressed by the DBP (Deutche Bundespost) towards the development of EDI services operated by private VANS is that is does not present a problem except in the case of straight resale of bit transmission.

- This attitude of low concern was also expressed by a German vendor offering EDI services via interfaces between the DBP's ISN (i.e., DATEX-P) and a worldwide network.

- German users, however, expressed concern over the DBP's pricing policy for Datex-P, which is the major vehicle for EDI development. The debate centres around price increases that bear little relation to cost and the lack of adequate volume discounts. A further complicating factor for EDI users is the differential tariff structure between Federal States.

E. TECHNOLOGY

- Vendors interviewed by INPUT almost uniformly rated the technology issue of low concern.

- Current European usage of third-party EDI services is mostly bulk batch store and forward data transmission, and the techniques of handling this type of application have been available in the information services industry for 20 years.

- The marketplace for EDI can be characterised as demand-pull rather than technology-push--a refreshing change from some other applications services in the VANS area.

- The future evolution of EDI will, however, impact technological developments and provide opportunities for vendors.

- Concern about security will generate a demand for encryption services, especially as EDI develops within the financial services community.

- EDI usage is migrating from batch file transfer towards on-line systems and the automatic generation of system to system messaging between interactive databases.

- EDI using electronic mail with pre-formatted forms is an ideal solution, not only for the need to exchange information to support documentation but also as a method of integrating smaller companies into EDI and providing a growth path for future expansion.

- Opportunities also exist for the development of effective techniques for exchanging graphics and CAD/CAM data and relatively unstructured business information documents.

- Longer term opportunities include linking EDI with expert systems, thereby removing the need for manual intervention at the middle management as well as clerical levels of a user organisation.

F. NETWORK INTERLINKING

- The non-universality of communications links is potentially a major inhibiting factor. Several large users with trading partners across multiple industry sectors expressed concern about having to enter into agreements with more than one VANS vendor.

- Internetworking agreements between VANS are beginning to take place as exemplified by the recent collaborative joint venture between ICL/Mercury and GEISCO. Network interconnection permits ICL customers to gain access to an established international network and GEISCO's customers to electronically trade with ICL's already well established U.K. user base, a complementary strategic partnership.

- Other vendors interviewed saw a clear need to link networks given the pressure of user demand. For example, ISTEL has promised its customers gateways to Motornet, GEISCO's network for the automotive sector.

- Although network interlinking is technically possible (probably via an X.400 bridge), there are a variety of commercial issues to resolve.

  - Network intercharging arrangements.

  - Complex billing arrangements arising out of differential tariff structures.

- Responsibility for errors as a consequence of trading via system gateways.

- Vendors also expressed interest in connecting with the public and private networks in recognition of the fact that a service catchment area is limited by reliance on one network.

- Several vendors pointed to the need for closer cooperation between the PTTs in order to develop common standards for telecommunications and a coordinated approach towards European networks. Implementation of the ISDN (Integrated Services Digital Network) will eventually lead to universal data communications. ISDN development is being greatly encouraged through the EEC-sponsored RACE (Research into Advanced Communications in Europe) programme.

- Network interlinking will also be encouraged by the formation of the Electronic Data Interchange Association. The aims of the association are to facilitate penetration and understanding of EDI and to ensure a faster payback on investment for VANS vendor participants.

G. PERSONNEL AND COMMERCIAL FACTORS

- A major factor affecting the development of EDI is the attitude of companies towards buyer/supplier relationships. On this issue it is possible to differentiate between two types of approach:

  - The aggressive approach.

  - The consensus approach.

- The aggressive approach is characterised by automotive manufacturers who have forced EDI on their suppliers as part of their terms of trading. Supplier resentment has arisen as a result of having to adopt multiple methods/standards/terminals and high staff and training overheads in dealing with customers who adopt different approaches.

- The consensus approach recognises the need to develop long-term relationships with the supplier and leads to greater cooperation but extended lead times for the development of EDI.

- EDI implementation is most cost effective between companies which have stable trading relationships. Consequently, there is a tendency for organisations to only integrate their larger strategic trading partners via EDI; for example, suppliers producing products for which there is little or no direct competition and/or products for which there is no incentive to switch suppliers to take advantage of price, quality, service, and payment term differentials. EDI, therefore, closely impacts upon an organisation's purchasing strategy.

- Commercial relationships have served to act as an inhibitor on the development of EDI within the retail distribution chain as suppliers have only perceived paperless purchase orders as having benefits for the retailer. Also, some retailers did not want to speed up the reverse invoicing cycle, preferring to gain profit from the float in a low-margin industry. EDI success, therefore, relies on its development to the mutual benefit of trading partners.

- Both users and vendors interviewed were in universal agreement that senior management support was important to the implemenation of EDI because of its impact on internal operating and control procedures across a number of departments in an organisation.

- Successful vendor marketing will seek to target and focus on those companies and industry groups where the factors of support and mutual cooperation are present in order to reduce the lead time on profitable service development.

- The users interviewed placed little emphasis on employee relations as a factor inhibiting development. One user pointed out that EDI had reduced staff turnover and released people for more interesting and productive work. Another user pointed to improved sales force efficiency as less time was being spent correcting errors.

H. PRICING

- Pricing is always a key marketing decision, especially at the early stages of development during the product life cycle. Sensitivity to costs exhibited by users will make pricing considerations an important focus of attention for VANS vendors.

- As illustrated in Exhibit IV-3, users view both the tangible and intangible benefits from using EDI to be sufficiently large as to make the service costs of low importance.

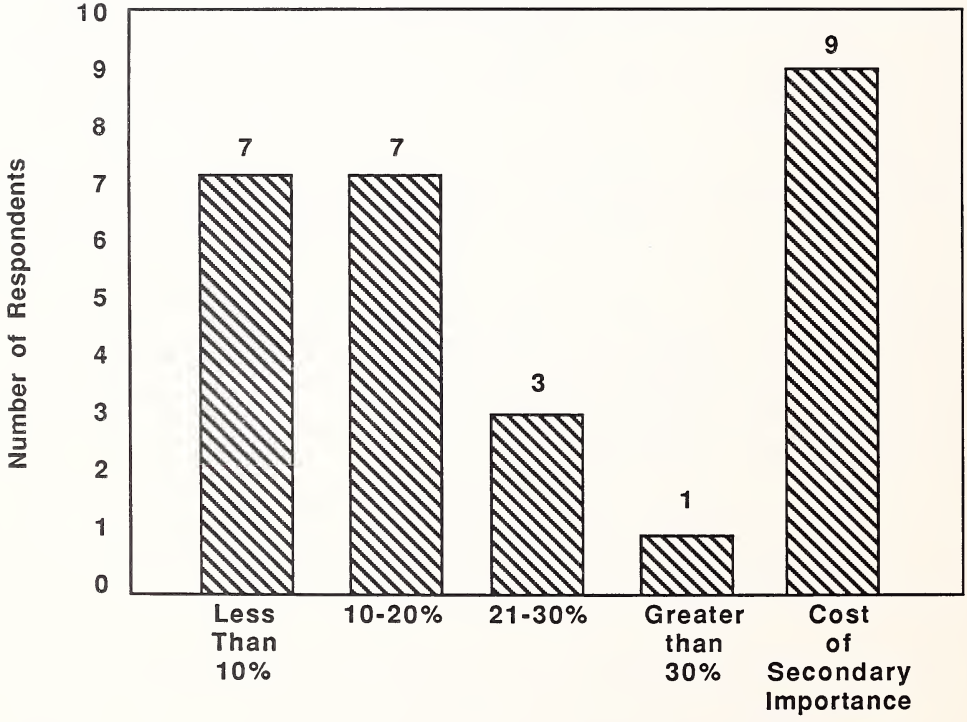
- The view is shared by half of the vendors who rate price of low importance. Their views are summarised by the following statements: 'The benefits of EDI far outweigh the costs'. 'Price is currently irrelevant owing to the low volumes during the pilot'.

- However, users that were not participating in EDI rated the issue of cost justification ahead of lack of awareness and low transaction volumes as the principal reason for not adopting EDI.

- This points to the importance of two strategic pricing initiatives: firstly, to offer low-cost pilot schemes to allow users to experience both the intangible as well as tangible benefits of EDI, and secondly, to develop low-cost turnkey startup solutions for smaller companies.

EXHIBIT IV-3

COST SAVINGS FROM EDI
(User responses when asked to indicate levels of cost savings anticipated from implementing EDI)



- The first of these initiatives supports the views of two vendors who rated price as a high concern and is summed up by the comment 'Price is critical at this early stage . . . but as awareness of benefits increases, the pricing issue will diminish in importance'.

- The second of these initiatives supports INPUT's findings among small user organisations whose views are summarised by the following comments:

  - 'The equipment cost can only be justified if we can communicate with large numbers of our customers'.

  - 'The startup costs are too high . . . we would prefer to pay a usage charge only'.

- Although no market price has been established in Continental Europe, ICL has had an effect on long-term market expectations in the U.K. concerning price by adopting a penetration pricing strategy for the Tradanet service.

- This aggressive pricing policy can be justified for the following reasons:

  - The need to establish market share and attract a critical mass of users.

  - The need to establish clear competitive cost advantages against existing methods, i.e., direct links and magnetic tapes. One user cited a break-even point of 10 megabytes/month before it was advantageous to switch to VANS communication links.

  - The extent of 'value added' is limited as there is minimal format conversion required between in-house and Tradacoms standards.

- Other vendors operating in the U.K. market are stressing the additional benefits of international communications, implementation support, security, etc., that theoretically justify a higher price.

- Fundamentally, EDI service pricing should be based on 'value added' as perceived by the end user. In this respect, there is clearly scope for upward flexibility in vendor pricing.

- EDI development has not been inhibited in the U.S. by tariff structures that quote service charges as high as $1.00 per 1,000 characters and are now no lower than $0.20 for 1,000 characters even after volume discounts.

- Nevertheless, vendors should be aware from the results of the user survey that cost consciousness exists among potential users in an embryonic market. This points to the need to educate users about both the long-term and short-term commercial benefits of EDI.

- In addition, it is necessary to provide financial incentives to existing users to encourage the transition from pilot to volume implementation. It is suggested that fixed, easily budgeted usage charges may well aid this process.

I. EDI IMPLEMENATION

1. SOFTWARE DEVELOPMENT

- Companies installing translation software usually require customisation to convert in-house data formats to EDI standard formats. Also, the links to other applications have to be written.

- The vast majority of users interviewed by INPUT said they would develop EDI software in-house rather than acquire it.

- Only two respondents said that they would modify an outside package according to their needs.

- Only three respondents preferred to rely on software hosted on the VANS vendors' processors.

- The reasons given were the cost-effectiveness of a once-off translation development, flexibility of in-house expertise, and also that there was little or no EDI software available.

- The lack of commercially available EDI software is particularly marked in France and West Germany where there is no software available for a micro-computer, the emergent EDI workstation. There is also no current involvement of Italian software houses in EDI.

- This supply side deficiency is compounded by problems relating to some of the existing packaged software which has been developed for specific industries and is not readily transportable; for example, the COPS package available from Philips.

- Users interviewed by INPUT that were evaluating or using a VANS vendor for EDI placed a high degree of importance on the availability of implementation support. This provides an opportunity not only for VANS vendors but also for consultants and professional services firms to handle customisation and assist in EDI implementation.

2. CRITICAL SUCCESS FACTORS

- Users interviewd by INPUT were asked to express their opinions as to the three most critical success factors that would ensure success in the implementation of an EDI system. Not unlike EDI standards, there was a wide variety of response. The ten most frequently mentioned factors ranked in order of importance are as follows:

  - Common standards.

  - Large number of participants.

- Reliable implementation deadlines.
- Total commitment by all parties.
- Ease of use.
- Reliable software and hardware.
- Data security.
- Good working relationships with trading partners.
- Clearly visible benefits.
- High-quality implementation personnel.

- The critical success factors in EDI implementation are listed in Exhibit IV-4.
- The strategies of current market participants and an evaluation of the development of several European EDI initiatives are discussed in the next chapter.

J. SECURITY

- Users and vendors interviewed by INPUT uniformly rated security as of high concern.
- Information about a company, its customers, and its sales is confidential. Other companies receive this information only to perform needed services. Each company and third-party vendor is responsible for keeping its data from unauthorised parties. The data elements which may be transmitted to authorised parties are specified in EDI standards.

EXHIBIT IV-4

CRITICAL SUCCESS FACTORS IN EDI IMPLEMENTATION

- Common Standards
- Large Number of Participants
- Reliable Implementation Deadlines
- Total Commitment by All Parties
- Ease of Use
- Reliable Software and Hardware
- Data Security
- Good Working Relationships with Trading Partners
- Clearly Visible Benefits
- High-Quality Implementation Personnel

- Users are concerned about internal breaches of security as well as the vulnerability of information sent to and through third parties. There are also concerns that data be properly translated between formats and validated.

- EDI vendors directly address this issue by incorporating a variety of security features into systems design:

  - Unauthorised access is prevented by multi-level password protection.

  - Transmissions are checked for validity on a number of criteria and exceptions are flagged for collection, correction, and resubmission by the sender. Vendors offer the optional feature of validation as an integral part of the translation process where formats of individual fields are checked and, if necessary, reformatted.

  - Security copies are taken of transmission files to safeguard against hardware or system failure.

  - Storage techniques file messages chronologically by message type and access by service users to the content of another individual's messages is prohibited.

  - Encryption services are offered by some vendors operating in the banking sector.

  - Reporting features provide users with an audit trial by monitoring the progress of messages through a system.

  - Security audits are commissioned covering physical as well as data security and are available for customer review.

V CURRENT VENDOR SERVICES AND STRATEGIES

V CURRENT VENDOR SERVICES AND STRATEGIES

A. VALUE-ADDED NETWORK SERVICE VENDORS

- In the U.S., the EDI service market is dominated by the McDonnell Douglas Corporation's EDI-NET and General Electric Information Services Corporation's EDI*Express. Both these companies are planning a phased entry into the Western European market and have launched services in the U.K.

- However, the U.K. market is currently dominated by ICL's Tradanet and ISTEL's Edict Services which are rapidly expanding from their origins in the retailing and automotive sectors, respectively. IBM Business Network Services entered the U.K. market in July 1986 with its Information Exchange offering.

- Although there is scope for organisations to enter the EDI market, as evidenced by its burgeoning growth potential, INPUT suggests that the market will continue to be dominated by a limited number of players operating both individually and in cooperation with other vendors.

- The factors that are driving market concentration are as follows:

  - The need to support the requirements of multinationals and companies with suppliers or customers in a number of country markets.

- High levels of investment required in telecommunications, hardware, software, and personnel in order to provide a comprehensive range of services, including implementation support.

- The need to offer potential users a network service which can communicate with a substantial 'critical mass' of participants.

- As EDI is essentially a cross-industry application driven by the recognition of mutual benefit of various industry sectors in working more harmoniously, e.g., finance with manufacturing, retailing with manufacturing, or transport with manufacturing, INPUT suggests that the successful vendor services will be those that are best positioned to support a variety of industry segments as EDI development follows the natural trading links in the economy.

- Exhibit V-1 lists the current VANS vendor services and identifies the current principal industry users.

- INPUT's estimates of the current market shares held by the principal VANS vendors operating in the U.K. based on the estimated number of customers is shown in Exhibit V-2.

I. ICL INTERNATIONAL NETWORK SERVICES/MERCURY

- Oftel (Office of Telecommunications) gave permission in July 1986 for a joint venture between computer manufacturer ICL and national carrier Mercury. The joint company is 75% owned by Mercury's parent, Cable and Wireless, leaving ICL a minority stake.

- Mercury has acquired responsibility for managing ICL's X.25 data network and duplicated network management centres with ICL providing sales, marketing, and applications support. The network has been rebranded as Mercury 5000 and is being upgraded with new Ospac switches to replace old Amdahl switches, and 20 further protocol processors are to be added.

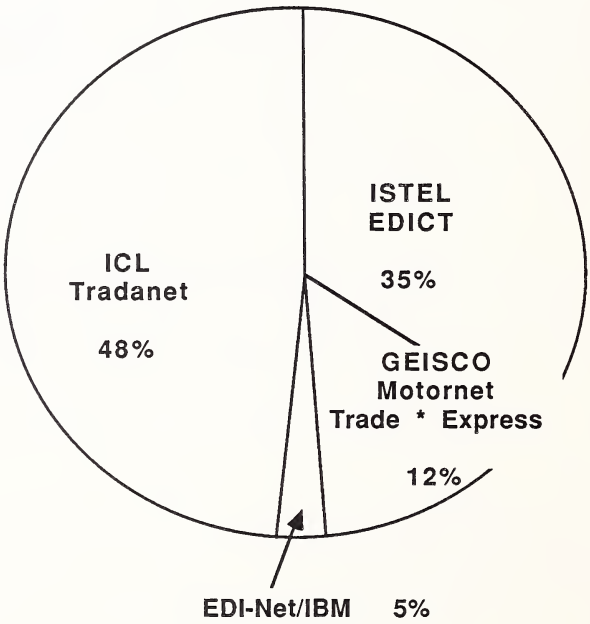
EXHIBIT V-1

EDI VANS VENDORS

VENDORS	SERVICE	PRINCIPAL USERS
ICL/Mercury	Tradanet on Mercury 5000 Brokernet	Cross-Industry Insurance
GEISCO	EDI * Express on Mark III Net - Motornet - Trade * Express	Cross-Industry Automotive Exporters/Banks/ Transportation
ISTEL	EDICT on Infotrac	Cross-Industry
British Telecom/ McDonnell Douglas - EDI-Net Ltd.	EDI-Net	Cross-Industry
IBM (BNS)	Information Exchange	Financial Services

EXHIBIT V-2

CURRENT EDI MARKET SHARES BY NUMBERS OF USERS (UNITED KINGDOM)



- Schematics of the Mercury 5000 Network configuration and TRADANET service are shown as Exhibits V-3 and V-4, respectively.

- As previously mentioned, a gateway has been established between the Mercury 5000 network and GEISCO's extensive international network.

- The principal EDI VANS service running on Mercury 5000 is Tradanet, which was launched in May 1985 after nine months of testing with the endorsement of the ANA. Tradanet now accommodates over 15% of the estimated 500 users of EDI in Europe. ICL also offers an X.400 service across Mercury 5000 in direct competition with British Telecom's message handling system.

- Tradanet was developed in conjunction with the Article Numbering Association (ANA), the retail industry association most famous for having devised a bar coding system for grocery products. Article numbering, as well as offering benefits arising from internal systems integration, also offers potential benefits in inter-company communications.

- Participants in Tradanet all use the ANA's Trading Data Communications Standards (Tradacoms). The common acceptance of this generic EDI standard, which requires minimal conversion from in-house document formats, has allowed ICL to develop a service that is less expensive than comparable vendor products.

- The Tradacoms standards developed from a working party of ANA members set up in 1980 and were fully published in 1982. Tradacoms standards are based on the GTDI syntax rules originally developed by the U.K. government organisation SITPRO (Simplification of International Procedures Board). Messages have been developed for a wide range of documents, e.g., purchase orders, invoices, stock lists, picking lists, delivery notes, credit notes, etc., and are endorsed by HM Customs and Excise as a legal part of the audit trial.

EXHIBIT V-3

THE MERCURY 5000 NETWORK

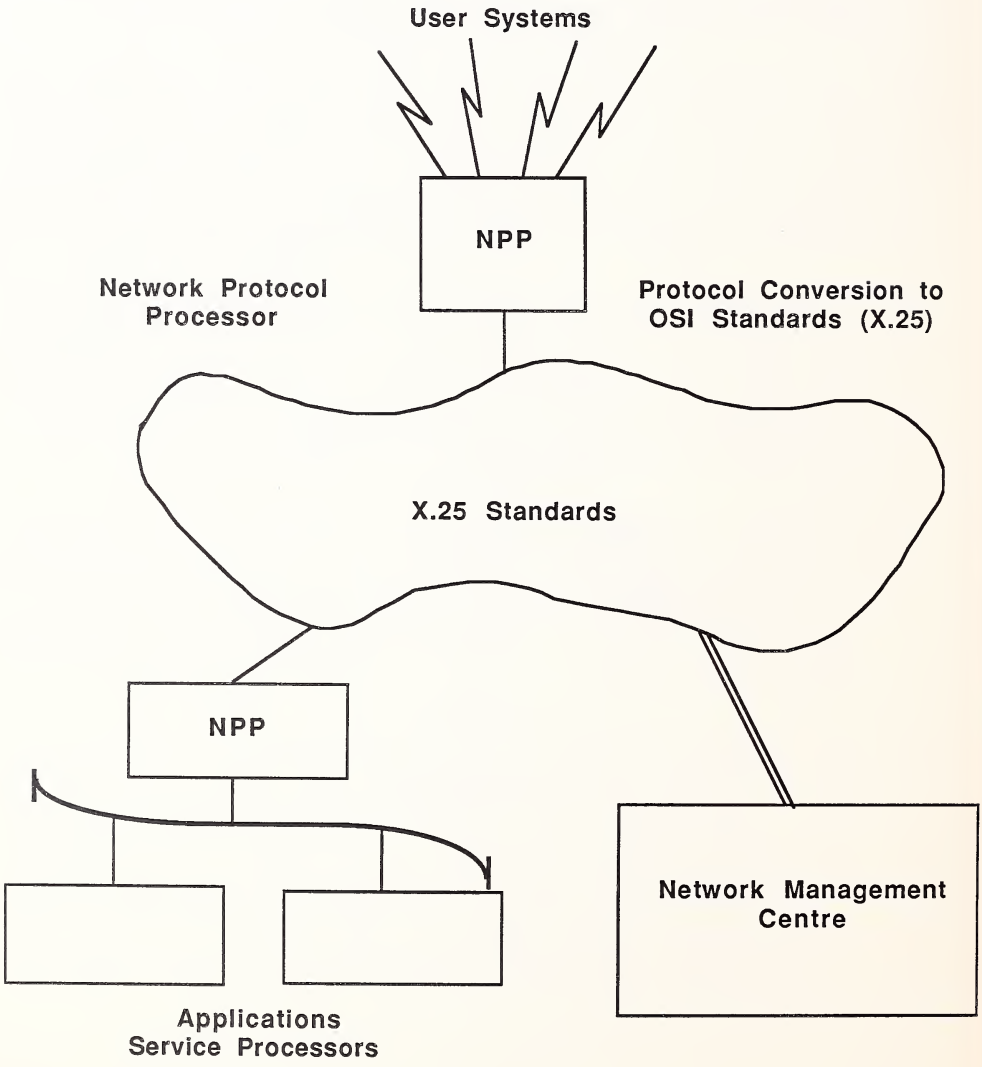
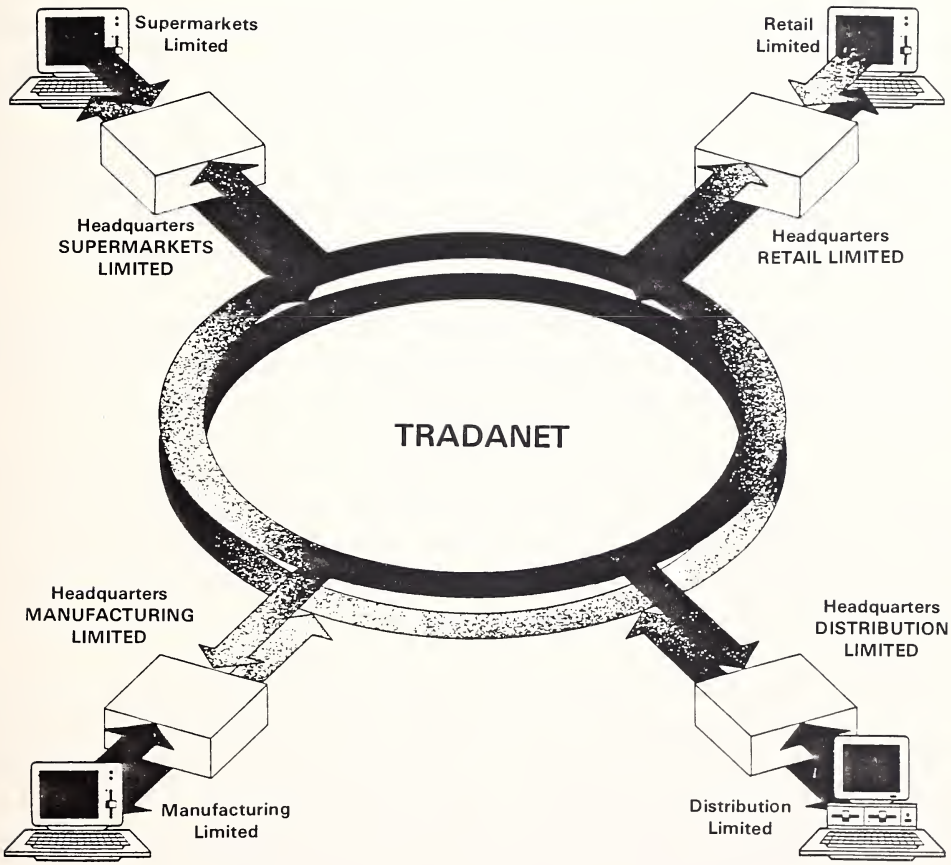


EXHIBIT V-4

TRADNET - ELECTRONIC DATA INTERCHANGE SERVICE



TRADANET WILL CUT OUT 60% OF PAPERWORK BETWEEN RETAILER AND SUPPLIER

- Tradacom standards are currently used by over 250 of the ANA's 4,200 members, and in the case of Woolworth's and Boots for more than 80% of their transactions. Tradacoms standards have been designed flexibly to accommodate users who choose to exchange information by magnetic media, i.e., tapes and diskettes, which is still utilised for EDI communications in the retail distribution chain.

- The overall Tradacoms standards allow for different formats for different industry sectors. This has facilitated the adoption of standards and usage of the Tradanet service across an increasingly broad range of industries including non-food manufacturing, health, shipping, freight forwarding, nationalised industry, public utilities, and local government. The ANA's current problem is agreeing on new message formats to accommodate new industries wishing to participate in Tradanet.

- The development of Tradacoms as a cross-industry standard at the application level differs from the situation in the U.S. where EDI has developed around fragmented industry-specific standards.

- Tradanet was established with the objective of providing users with a low-cost alternative to direct links and magnetic tape exchange and offers the basic services of protocol conversion and a store and forward mailbox facility. The service is available 24 hours a day, 7 days a week, and has exclusive endorsement of the ANA until 1990.

- Tradanet acts as an electronic clearinghouse for its participants. Messages are sent via dial-up or leased line access to a local network node in a variety of communications protocols. Tradanet supports bisynchronous 2780 or 3780, Full XBM, C03, SNA/SDLC, and X.25 either point-to-point connection or via British Telecom's Packet Switch Stream Services (PSS). Messages are forwarded through the network from a 'post box' allocated by the sender to the appropriate recipients' 'mailboxes' from where they can be collected (by calling up the network) and processed at a time convenient to the receiving organisation.

- The Tradanet tariff structure can be summarised as:

  - A once-off joining fee of 2,500 pounds.

  - A volume charge averaging 2p per 1,000 characters.

  - A minimum service charge of 20 pounds per week.

  - The 'sender' of the data is billed.

- In recognition of the problems of EDI implementation and that it typically takes about three months to commence live usage of Tradanet, ICL has developed a range of 'Tradastart' products and services as follows:

  - TRADA-HELP - a consultancy service (charged on a personday basis) which can assist with problems such as the use of Tradacoms, hardware requirements, and the development of software for converting data from in-house to Tradacoms formats.

  - TRADA-SNA, TRADA-2780, and TRADA-S38. These software packages provide both the necessary communications driver and command generating modules for the appropriate protocol interface.

  - Training courses are available to help user personnel diagnose any queries that may arise in the daily running of the service, thereby reducing the requirement for technical support from DP staff.

- The ANA is anxious that Tradanet should be attractive to smaller companies, and it is essential that a low-cost packaged turnkey solution is developed for these users in addition to the existing 'Tradastart' services.

- Tradanet is already showing a significant impact on the logistics of both manufacturing and retailing. Savings of up to four days in the order/invoicing cycle have allowed participants to reduce safety stock levels to a minimum. Similarly, the change in the psychology of buyer/supplier relationships has facilitated improved customer service and enhanced operational flexibility.

- Given the presence of these clear proven commercial benefits and the enhanced strength of the organisation's market position achieved via joint venture, INPUT believes that the service is poised for significant growth.

- The second of ICL's strategic markets, insurance, is being addressed with the Brokernet service which aims to link together high street bankers, Lloyds syndicates, and insurance companies.

- The role of London as a major financial centre, increased competition following deregulation of the City, and the need for insurance companies to communicate with large number of intermediary brokers makes the trend towards increased use of networks for EDI and information services by insurance companies inevitable.

- The first phase of Brokernet development has been in the motor insurance field in joint collaboration with Lloyds syndicate broker John Holman & Sons and broker systems supplier Mitronix Ltd., who provide micro-based packages.

- The Brokernet service includes format conversion in addition to the standard facilities of protocol conversion and store and forward mailbox. However, nine of the companies participating in the current trial period are also active in developing standards based on the GTDI syntax rules, and a wide variety of messages are planned, i.e., proposal forms, claims, cover notes, mid-term adjustments, proof of no claims, discounts, renewals, etc.

- Brokernet is also linked to the Moteq and Quoteline services which allow brokers to obtain immediate quotes on motor and life business, respectively.

- These services operate in direct competition with British Telecom's Mediat service and IBM's Unidex system, which has been developed as a consequence of the success of IVANS in the U.S.

2. ISTEL LTD.

- Istel was formed in 1979 as BL Systems Ltd., engaged in the provision of computing, communications, and systems services primarily for the BL Group. It was renamed Istel in January 1984 to reflect the company's separate identity and the growing importance of contracts outside the group. It has now developed into one of Europe's leading information service companies with a turnover of over 50 million pounds and 1,300 employees.

- The company has two key areas of expertise--VANS and AMT (Advanced Manufacturing Technology).

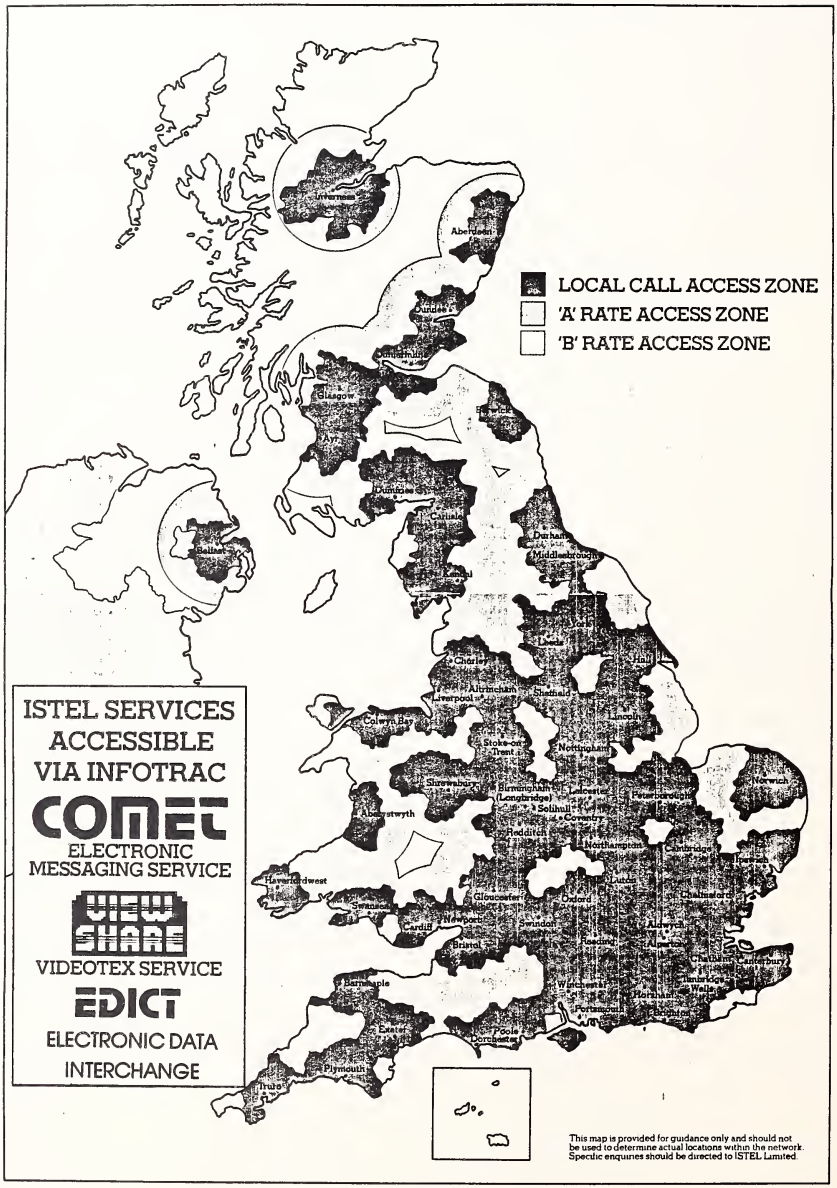
- ISTEL's VANS services which include VIEWSHARE (the largest videotex bureau in Europe), COMET (an electronic mail service), and EDICT (a clearinghouse service for EDI) are accessed via the INFOTRAC network which is the largest private data network in the U.K. and provides local call access for 98% of the U.K. business community through 67 access points.

- A schematic of the INFOTRAC network, which includes nearly 200 miles of microwave radio paths and handles over 70,000 connections per day, is included as Exhibit V-5.

- The EDICT service, launched in June 1985, now has over 80 subscribers and is rapidly expanding from its base in the automotive sector (Austin Rover chose Istel as its sole contractor for EDI) into manufacturing, distribution, finance, travel, and health.

EXHIBIT V-5

ISTEL'S INFORTRAC NETWORK ACCESS ZONES



- ISTEL's strategy for EDICT is focussed around a strong commitment to the 'product' and user support. EDICT is supported and marketed via a separate EDI business unit with profit responsibility.

- ISTEL has been innovative in their pricing tactics by moving away from transaction-based pricing which can discourage volume implementation. ISTEL's tariff structure can be summarised as follows:

  - A sign-on/implementation fee of 1,150 pounds for a dial-up (this includes standard consultancy support).

  - A fixed document charge of 950 pounds per annum.

- This tariff structure is easily understood and is easily budgeted for, i.e., 4,000 pounds over three years.

- Future plans for the EDICT service include the provision of videotex front ends to facilitate ease of use and low-cost terminal access, a paper factoring service using EDICT and ISTEL's LASERLINK products, and the provision of a data archive; for example, seven years of invoices to satisfy customs and excise requirements and links to financial clearinghouses.

- ISTEL's strategy to obtain a 'critical mass' of users is based around speed and ease of implementation. The company has been actively working with software houses to tailor financial packages to provide EDICT front ends. Software houses have also been recruited as distributors of the EDICT service. Small companies are supported via a turnkey package which includes a microcomputer coupled with data entry and receive and print software.

3. GENERAL ELECTRIC INFORMATION SERVICES (GEISCO)

- Following extensive experience in the U.S. (GEISCO develped the first EDI network, Transnet, for the Motor Equipment Manufacturers' Association in

1978), the company entered the U.K. market by gaining the endorsement of ODETTE for its MOTORNET service which was launched following a trial by 18 companies in September 1985.

- The MOTORNET service offers minimal functionality (i.e., no translation and format conversion) as an alternative to direct links and is currently used by 25 companies including General Motors and Peugeot Talbot.

- GEISCO has also conducted a European launch for its international umbrella product EDI*Express, which offers generic EDI capability including full format conversion and the ability to transmit at the document level rather than full file transfer.

- EDI*Express is operated as part of the Mark III teleprocessing service which is the world's most extensive network with approximately 750 access points. It supports all published message standards including translation from private formats. The system can be accessed using 300 and 1,200 bps asynchronous protocols and IBM's bisynch 2780/3780 protocols at speeds of 2,400 and 4,800 bps. Motornet also supports 3270, TTY, and X.25 access.

- The company invested a total of $200 in networking and front-end processors in 1985 and is in the process of tripling the size of its worldwide network.

- The tariff structure for EDI*Express is complex and includes a session fee, per document charges (split between receiver and sender), and unbundled charges for auxiliary services such as translation, trading partner maintenance, compliance audits, additional storage, and reports. In addition, there is a one-off service initiation fee and a minimum usage charge.

- Two microcomputer software packages are available, GE*Link and EDI*PC, which provide menu driven communications and form fill screens. These packages also facilitate the configuration of micros to work with larger host computers to permit translation from internal, private standards to public standards.

- The support program is called Quick Connect and includes documentation, training guides, and network software with which users define their EDI environments and implement or change the communications parameters used with trading partners.

- GEISCO's Quick Comm E-Mail supports electronic document translation in addition to messaging and provides a growth path for small users into EDI.

- GEISCO's marketing strategy is to develop its strength in international networking and focus on cross-industry applications such as banking, transportation, and international trade.

- GEISCO has launched Trade*Express as a subservice for the international trading community which includes facilities such as an electronic bulletin board, trade conferencing, trade data bases, and E-Mail which can be used to support structured document flows.

- The PC-based Trade*Express package uses SITPRO's SPEX II export documentation software to create trade documents which can then be distributed worldwide via EDI*Express.

- GEISCO currently operates a strategy of limited direct promotional push, preferring to rely on distribution agreements with third parties, i.e., value-added service providers (VASP) for specialist market areas. There are currently two agreements; the first VASP is Wildata, a subsidiary of a Norwegian shipping company, Wilhelmsen Group, which offers Wilnet an electronic exchange service for the shipping and cargo industry. The second VASP is the First National Bank of Chicago, which offers an accelerated trade payments package allowing exporters to present electronic trade documents to overseas banks for payment of letters of credit.

- GEISCO has also become established in the retail sector, having gained the endorsement of the CCG in Germany to create the SEDAS Data Service which currently has 18 users, and the Transnet service on behalf of the Sticht Uniforme Artikel Codering (UAC) in the Netherlands which now has 20 users after its launch in February 1986.

- GEISCO is clearly in a strong position to expand from its base in a range of industry sectors and will undoubtedly emerge as a dominant player, especially in continental European markets.

4. MCDONNELL DOUGLAS INFORMATION SYSTEMS INTERNATIONAL (MDISI)

- In the U.S., McDonnell Douglas' EDI-Net has a dominant share of the market with over 300 clients who have successfully implemented the service, which now supports over 2,000 trading partnerships across a wide variety of industry sectors. Corporate revenues for the Information Systems Group are $1.2Bn.

- McDonnell Douglas entered the U.K. market in October 1985 by announcing a 50/50 joint venture with British Telecom, Edinet Ltd. The partnership can be viewed as a highly complementary marriage which combines the strengths of McDonnell Douglas's international Tandem-based X.25 network, proven software products, and experience in the EDI market with British Telecom's communications expertise, resources, and U.K. marketing presence.

- The company's strategy is to recruit companies representing many industries to its EDI services, with these companies in turn drawing trading partners to the network for data exchanges; for example, the distribution and transportation sectors. In addition, the company intends to leverage its experience in the U.S. by targeting on the electronics, petrochemical, and grocery sectors.

- However, since its announcement, Edinet has remained low key in the U.K. and has only succeeded in developing pilot projects with a limited number of

users. User resistance may well have emerged to the U.S.-based processing service which may deter customers without transatlantic connections. However, it is planned to install and EDI*Net distributor switch in the U.K. during Q1 1987.

- MDISI plans to extend its EDI offerings into the Continental European markets and foresees strong growth potential in France and also in the Netherlands and Scandinavia owing to the heavy concentration of activity in exporting and high labour costs.

- A further facet of MDISI's European strategy is to develop partnerships and service licensing arrangements with key industry players. Clearly, the U.K. experience demonstrates their ability to cooperate with PTTs, an important factor when entering more regulated continental markets.

- Edinet Ltd. is currently offering a full range of EDI services including:

  - Store and forward messaging.

  - Automatic message translation.

  - A wide range of protocol conversion.

  - Support for a wide range of EDI standards.

  - Micro-based application products, e.g., EDI*Translator for an IBM PC XT or AT.

  - Support services such as executive seminars, fully packaged and documented startup software, and post-installation support.

  - Specialist consultancy services to support clients fully throughout all phases of study, planning, and implementation, i.e., EDI*Consultancy.

- Edinet's current tariff structure can be summarised as follows:

  - No joining fee.

  - A mailbox fee of 30 pounds per month payable by sender and receiver.

  - A sliding scale of usage charges, i.e., 25p per document for up to 1,000 documents, 20p per document between 1,000 and 10,000 documents, and 15p above 20,000 documents p.a.

- This pricing structure has been devised to make the service cost-effective for a user contemplating a pilot scheme.

- The company feels that its strengths lie in its ability to assist in implementation and also to incorporate EDI with other applications and services, e.g., database subscriber services.

5. IBM BUSINESS NETWORK SERVICES (BNS)

- IBM Business Network Services was started in July 1986 and reflects the company's firm commitment to emerge as a significant player in the European VANS market. BNS was essentially born out of the failed joint venture with British Telecom (JOVE), which was rejected by Oftel in 1984, and the former IBM Information Network Services (INS).

- The backbone of IBM's EDI service offering is provided via a European-wide star SNA network linking data centres in all major country markets. This is linked to a transcontinental data communications network which is planned to connect Europe with the U.S., Asia, the Middle East, and Africa.

- IBM BNS offers a range of currently discrete services:

- Managed Network Services to facilitate file transfer between customers' mainframes and terminals.

- Information Exchange (IE) which provides store and forward mailbox facilities. IE was originally launched in the U.S. in 1983 and was developed by IBM as a proprietary product for the IVANS project.

- The PROFS E-mail, which is available on IBM mainframes or on a bureau basis for small users. PROFS has supported IBM's entry into the insurance market.

- Information exchange (IE) supports messages formatted in accordance with UN/GTDI syntax rules, and the system can be assessed using standard IBM protocols, i.e., 2780/3780/RJE and SNA. There is currently no conversion from non-IBM standard protocols.

- The pricing structure for IE can be summarised as follows:

  - All charges apply to both sender and receiver.

  - Once-off and monthly network connection charges for leased line connection, and a once-off charge of 150 pounds for dialed connection.

  - IE usage charge of 16.5p for the first segment and 6.0p for subsegments (i.e., 3,700 bytes).

  - IE storage charge 43p/Mbyte/hour.

  - Discounts are available subject to allowances based on commitment of up to a maximum 36%.

- Although it would appear that the current service offering is directed at large IBM mainframe installations as evidenced by the synchronous nature of the

network, IBM intends to aggressively pursue European opportunities for VANS services and is poised to make a significant impact, especially in continental markets.

- IBM has already been endorsed by ICODIF in Belgium for the provision of EDI services to companies in the retail distribution chain and is well positioned to enter any number of vertical markets, especially financial services.

B. EDI SOFTWARE

- The EDI software marketplace is embryonic, and the vast majority of existing packages have been provided by SITPRO as part of the UN/ECE support program to propagate the use of EDI and facilitate international trade.

- Exhibit V-6 shows the existing vendor companies and packages offered, and provides INPUT's estimate of the number of installations using their software.

- INPUT believes that there are major opportunities for independent software houses to fill two gaps in the EDI market:

  - As distributors of existing packages, providing development in line with evolving standards and support in implementation.

  - To develop micro-based EDI software to capitalise on first stage EDI implementations, especially in small organisations.

- Opportunities also exist to integrate EDI with other applications such as order entry, inventory control, materials resource planning, distribution, and decision support.

EXHIBIT V-6

EDI SOFTWARE

VENDOR	Mainframe	Mini	Micro	Estimated Number of Installations	COMMENTS
SITPRO					
• Spex II			X	300	Currently, mainly used in conjunction with paper document exchange.
• Interbridge	x	X	X	100	Source available implements UN/GTDI standard.
GLI • Intertex TDI • Convertor/ Editor	x	x	x	20	Accomadates UN/JEDI standard. Conversion SAD to TDI files.
SYSTEMS PLC DESIGNERS	x	x	x	6	Front-end application and network interface modules. Interbridge support.
PHILIPS • Cops		x		90 In-House	Supports GTDI standard. Table driven. Free to Third-Parties.

- There are also opportunities for professional services companies and software vendors to help EDI implementors resolve incompatibilities, convert batch-oriented to on-line systems, develop private EDI systems, and integrate networks.

- This section profiles some of the current software vendor offerings.

I. SITPRO (SIMPLIFICATION OF INTERNATIONAL TRADE PROCEDURES BOARD)

- SITPRO has been instrumental in developing procedures, standards, and application software tools for facilitating inter-organisational trade.

- The INTERBRIDGE packages, Construction and Translation, allow users to format and deformat data from internal files in accordance with the UN/ECE endorsed rules for application independent interchange (TDI).

- The software is written in COBOL and has been implemented on a wide range of manufacturers' mainframes, minis, and microcomputers. Conversions are generally straightforward given a COBOL '74 compiler.

- The packages are table driven and allow users to redefine existing messages and create new messages. The table also specifies the interface to the in-house system and defines on which record type each data element is located and its position, length, and format. It also detects errors such as missing mandatory data since transmission sequence is predefined.

- Other features incorporated in Release 3 include audit prints, multiple transmission handling, and validation.

- The source of each package is separately licensed and costs 2,000 pounds per user site. An object code version is available for many 16-bit micros at 750 pounds per suite. This version includes menus and screen displays.

- SITPRO has also developed INTERSECT, an interactive package that aids INTERBRIDGE table maintenance.

- INTERBRIDGE is being used by companies in a wide cross-section of industries in the U.K. and also in Sweden, Switzerland, Norway, Belgium (where it is distributed by XYLOS), Australia, and Holland.

- A schematic illustrating the flexibility of INTERBRIDGE is given as Exhibit V-7.

- SITPRO also offer a micro-based package SPEX 2 for export invoicing and documentation which is licensed through an authorised distribution network (nine dealers as of June 1986).

- SPEX 2 runs on a range of about 40 microcomputers and costs up to 2,000 pounds for a single screen version.

- SPEX 2 is menu driven and allows users to:

  - Store full details of customers and products.

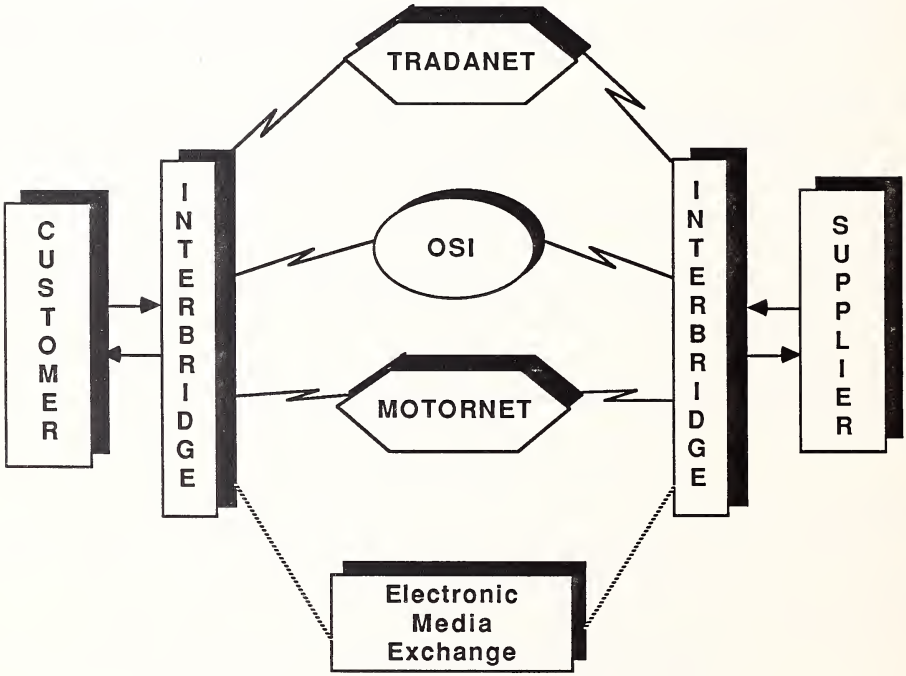
  - Assemble shipment details and calculate weights, invoice values, discounts, currency conversions, and freight charges.

  - Produce over 40 export documents including customs forms, standard shipping notes, export invoices, and the SITPRO Master Document.

  - Link the other in-house systems for exchanging information handled by SPEX 2.

EXHIBIT V-7

THE FLEXIBILITY OF INTERBRIDGE



2. SYSTEMS DESIGNERS PLC

- SYSTEMS DESIGNERS are endorsed by the SMMT as sole authorised suppliers to the ODETTE community. The company won supplier status in July 1986 in competition with Edinet Ltd.

- The company is also a distributor of SITPRO's INTERBRIDGE software and has assumed responsibility for product development in line with evolving standards, commercialisation, and user support in the U.K., Holland, and Sweden.

- For the ODETTE community, SYSTEMS DESIGNERS is offering INTERBRIDGE coupled with:

  - Front-end application modules to support all available mesages (11 by the end of 1987).

  - Network interface modules to link with all clearinghouses, i.e., GEISCO's Motornet, ISTEL's Edict, and Fordnet.

- The company offers a startup package for 1,500 pounds which includes micro Interbridge, three application modules, implementation support, and training. Additional application modules are available at 150 pounds per message.

- SYSTEMS DESIGNERS is providing bespoke application interfaces with in-house systems for large mainframe users and supports small users with an EDI workstation, initially an IBM PC-XT/AT.

3. GESELLSCHAFT FUR LOGISTIK UND INFORMATION SYSTEME (GLI) MBH

- GLI of West Germany has developed software which accommodates the UN/JEDI international EDI standard.

- Existing products include Converter software which has been used by the ODETTE community to translate data from the fixed format VDA Germany automotive standard to the variable GTDI standard. The Converter/Editor package is priced at DM20,000.

- The company's Intertex TDI application software has been used to transfer information from the SAD (Single Administrative Document) to a recipient's in-house system in accordance with UN/GTDI standards.

C. EDI INITIATIVES

1. DISH (DATA INTERCHANGE FOR SHIPPING)

- The stated long-term objective of the DISH community is 'to develop a data interchange system that would allow exporters/importers to exchange data with shipping lines, trailer and ro-ro operators, airlines, and freight forwarders dealing with European trade and trade between Europe and the rest of the world'.

- The DISH community was established in November 1985 with the involvement of nine exporters, one freight forwarder, and five shipping lines with SITPRO and HM Customs and Excise as observers.

- The pilot project commenced in February 1986 administered by an advisory group which oversees both the pilot and the long-term strategy of DISH and a management group consisting of all the companies participating in the trial.

- Four task groups were also established, each having been assigned a specific area of study as follows:

  - Group 1 - Data Elements and Messages.
  - Group 2 - Communications.

- Group 3 - Legal.

- Group 4 - Trials.

- Five messages were developed from a large range of possible documents for the pilot project based on the UN/GTDI standard, as follows:

  - Shipper to carrier - booking confirmation and shipping instructions.

  - Carrier to shipper - schedule changes, invoices, and maritime contract information.

- ICL's Tradanet service was selected for the trial period which commenced in July 1986, and the communications options will be reviewed after its completion. The VANS option has allowed participants to experience the practical advantages of EDI with a minimum amount of effort and impact on their current operations.

- A list of current members of the DISH community is given in Exhibit V-8.

- The current status of DISH can be summarised by the words of one of the trialists as 'at the start of a long and arduous learning curve'. However, the success of the trial will undoubtedly encourage the larger participants to move towards volume implementation.

- It is envisaged that the community will expand to include a larger section of the freight forwarding community, smaller carriers and exporters, banks, insurance companies, and the ports who are currently heavily investing in computerisation.

- The potential for the development of EDI in the transportation sector is to some extent limited by the fragmented structure of the industry. For

EXHIBIT V-8

DATA INTERCHANGE FOR SHIPPING "DISH" COMMUNITY

		Trialists
Exporters:	Ford Motor Company	
	GEC	
	Glaxo	
	Guinness	*
	ICI	*
	May and Baker	
	Pilkington Glass	
	Rowntree Mackintosh	*
	Unilever	
Freight Forwarders:	Baxter Hoare	*
Carriers:	ACT	*
	Cunard-Brocklebank	*
	Hapag Lloyd	*
	Maersk Line	*
	OCL	*
Official Bodies:	SITPRO	
	HM Customs	

example, the French transport sector comprises some 2,850 companies, about 800 of whom engage in some form of freight forwarding. Eighty percent of the companies in the sector have, however, less than 50 employees, and only 5% more than 200 employees. The value added per employee is also low, mitigating against technology investments. There is, however, a heavy concentration of activity in exporting, around 1,500 companies represent 60% of the total export value.

- The French equivalent to the U.K.-based DISH project is the Telermes initiative which uses the TRANSPAC network to link exporters, forwarders, shippers, customs, carriers, and banks.

- Telermes' messages are based on the AFNOR (Association Francaise de Normalisation) CFE standard, first developed in 1983. This standard is now being converged with UN/GTDI.

- German transport operations are being nationalised by the introduction of the LOG (Logistal Optimisation of Goods Transport) system which is based on UN/GTDI standards.

2. EEC PROJECTS

- The Commission of the European Communities is actively sponsoring a variety of EDI projects under the aegis of the various directorates. However, progress may well be constrained by the lack of a central coordinating body for EDI development.

- The EC Commission programme of support for EDI focuses around two major axes:

  - Sectoral support to major community transnational projects such as ODETTE and the CEFIC initiative in the chemical industry. The commission provides organisational backup for meetings and interpretation as well as specialist advice and support.

- Financial support to specific EDI projects which is likely to be offered on a decreasing scale (i.e., an amount up to 50% of the cost of the project for its first year and a progressively decreasing share of costs in the subsequent years). It is anticipated that this will be approved by the Council of Ministers in the first quarter of 1987.

- Part of this programme will involve the establishment of testing centres to check the validity of software products and the progressive removal of legal obstacles to transborder data flow.

a. COST 306 - Transport

- The COST 306 project entered a demonstration phase in September 1986. Its objective is to establish methodologies for the facilitation and computerisation of transport procedures and document flow that will allow participants to remain competitive with Japan and the U.S.

- The COST 306 agreement has been signed by nearly all EEC and EFTA countries, including Yugoslavia and Turkey.

- The demonstration phase is taking place largely in Scandinavia and is virtually synonymous with the ambitious DEDIST project in the Northern European countries, which aims to link manufacturers with banks, customs operators, and freight forwarders.

b. CD Project - Customs

- The CD Project aims to link the European customs services and has developed out of the CADDIA project started in 1978. The aim is to minimise delays at frontiers and ports and speed up product handling by the use of EDI. The project is currently in a pilot phase.

- The U.K. Customs Directorate have developed the 'period-entry-export' system which allows for data to be passed to customs on magnetic tape using UN/GTDI standards. The next logical step is to facilitate direct computer-to-computer interchange.

c. The Committee Support System (CSS)

- CSS is an advanced mail system for electronic transmission and formatting developed for the Commission by ICL. The software allows almost any mini or intelligent terminal to connect to the X.25 packet switched European public networks.

- The system can create and store messages in all the languages of the community (except Greek) and can service a variety of different workstations and peripherals.

- Given that the system supports OSI connectivity, it would be important to those users who wish to link with several network vendors or, conversely, it could be offered by vendors as an additional service feature.

- It is an ideal tool for commitee members participating in EDI development, giving them access to data files and messages from overseas locations.

d. Mercator Project

- Backed by the EEC, the Mercator project ran from February 1983 until November 1984 and consisted of two concurrent trials, one Anglo-Belgian and the other West German. The aim was to pilot the feasibility of EDI and test the use of the UN/ECE standards in a working environment.

- Participants in the Anglo-Belgian trial included SITPRO, Vauxhall Motors in Luton, its sister company General Motors Continental in Antwerp, British and Belgian customs, the Belgian National Bank who received foreign exchange

control data, Sabena World Airlines who received airway bills, and the Belgian freight forwarder, Ziegler, in Brussels.

- The West German exercise was led by the German trade facilitation body DEUPRO and involved links between the defense procurement body, Bundesamt fur Wehrtechnik und Beschaffung im Koblenz and its suppliers, Standard Elektrik Lorenz AG and AEG-Telefunken.

- The major problem in Mercator was establishing data communication links. For example, participants found no less than 28 variations in the communications rules used by computers that all claimed to be IBM compatible. The project standard was IBM 3780.

- The success of Mercator provided the impetus for the official establishment of the ODETTE initiative.

3. ODETTE

- The impetus behind the development of ODETTE (Organisation for Data Exchange through Teletransmission in Europe) is the drive to cut costs in the European automotive industry in order to compete in world markets, especially against the Japanese.

- EDI is a central feature of the European car manufacturers' plans to implement the Japanese 'Just in Time' (JIT) method of inventory control in production and supply cycles. JIT is intended to reduce the running costs and risks of holding slow moving inventory as well as allowing the production line increased flexibility to respond to adjustments in customer demand.

- For example, Ford U.K. aims eventually to save four days of inventory holding once most of its 2,000 U.K. suppliers are connected to the Fordnet network.

- ODETTE claims that the initiative will save as much as $300 per car by reducing documentary processing and inventory financing costs. The Japanese currently have a $2,500 per car advantage on European manufacturers.

- In addition to lowering manufacturing costs, EDI compresses timescales from design concept to manufacture in new product development, reduces delivery times to dealers, and improves the ability to produce custom-built cars.

- ODETTE originates from the formation of a committee by the four major U.K. manufacturers represented in the SMMT in 1983. This developed into a European committee in May 1984 with the inclusion of the German trade association, the VDA (who had already developed an operational procedure), and representatives from the major manufacturers in France, Italy, Spain, Sweden, and Belgium.

- ODETTE was officially established with the issue of a Memorandum of Understanding on January 1, 1985.

- Each country has its own committee, and there are nine working groups to handle the tasks of teletransmission methods, document standards, and legal matters.

- 1985 was seen as the year when the efforts of the working groups were consolidated into the first set of standard messages, i.e., delivery instructions, dispatch advice, and commercial invoice. These are currently being trialed by over 60 companies in Europe.

- The messages have been based around the UN/GTDI syntax rules which facilitate the development of cross-industry trading relationships. For example, the small U.K.-based parts suppliers, Motor Products Automotive, only needs to use one standard to establish trading links with retail cash and carry outlets and wholesalers, as well as manufacturers.

- Well established standards at the application level will facilitate future development that could include customs, international trade, and the expansion of the trading links to include car dealers, general retailers, and the after market.

- In July 1986, work commenced on the development of a further eight messages due for completion by the end of 1987, i.e., credit note, remittance advice, ready for dispatch advice, confirm receipt of goods, order, contract, price list, and confirmation of delivery instruction.

- The groups also aim to establish standards for bar coding products and for exchanging data for computer-aided design and manufacturing (CAD/CAM).

- It is the policy of ODETTE that decisions regarding systems implementation, i.e., software and telecommunications, are left to the individual country organisations.

- While Japanese success can be attributed to a strong cooperative culture and work ethic, European cooperation in ODETTE has been fractured by commercial ambitions and nationalist pride.

- In the U.K. the SMMT's ODETTE group has favoured a clearinghouse approach. However, their approach has been uncoordinated, with General Motors and Peugot Talbot using the association-endorsed Motonet service supplied by GEISCO, Austin Rover using the EDICT service supplied by its ISTEL subsidiary, and Ford having developed its own network called Fordnet. It is envisaged that gateways between these networks will be established.

- The French, having had the ODETTE acronym selected especially to suit their language, have insisted on nominal independence by calling their operation GALLIA (Groupement pour l'Amelioration des Liaisons dans l'Industrie Automobile).

- French EDI development is faced with legal restrictions as under French law it is illegal to send an electronic invoice without the corresponding piece of paper; the 1980 Finance Act did away with that requirement in the U.K. For example, French component supplier Valeo sends invoices to Volkswagen from its radiator division, together with the requisite paperwork.

- The structure of the motor industry has prompted a different approach to implementation from the U.K. in the rest of Europe. The major continental manufacturers have preferred point-to-point links rather than a clearinghouse solution.

- While the four U.K. manufacturers have to solve the problem of integrating over 20,000 suppliers, continental manufacturers have few small suppliers. Consequently, it makes commercial sense to use direct links where, although the initial investment may be fairly high, added charges for data transmission are comparatively low. With MOTORNET, for example, while the subscription costs are low (200 pounds per annum and 200 pounds joining fee), the costs of data transmission are relatively high (12p per 1,000 characters for high-speed data transmission).

- The clearinghouse approach is, therefore, highly suited to the integration of small companies with low volume usage into EDI.

- Continental Europe is well placed to implement direct links because the PTT's provide data communications networks based on the international X.25 protocol. These networks link for international services.

- Although GALLIA in France is currently evaluating proposals for the use of a clearinghouse service, Renault is encouraging its suppliers to use the X.25 network, TRANSPAC. Volkswagen has opted for the German service, DATEX-P, and Fiat for the Italian service ITAPAC. In Sweden, the major participants, Volvo, SKF, and Saab-Scania AB, have implemented EDI using direct links.

- There is currently no involvement of the main Italian Remote Computing Services or VANS vendors with ODETTE. Fiat has pulled out of Motornet's Italian service due to high participation costs (estimated at 100 million lira). However, a hybrid network of direct links for major trading partners and a clearinghouse connecting smaller companies is envisaged as a long-term network solution.

- Italian participants in ODETTE entered a trial phase during the last quarter of 1986 with direct links being established between Fiat Auto, Alfa Romeo, and a few of their main component suppliers, e.g., Borletti and Marelli (both Fiat-owned companies). It is planned to extend these links to other European car manufacturers and other companies in the Fiat Group (e.g., Jager and Solex, which were acquired from the French Matra Group).

- Currently, there is no involvement of Italian software companies in the ODETTE project.

- Although the U.K. has endorsed SITPRO's INTERBRIDGE translation software with implementation support from Systems Designers, concern over cost and support has led continental participants to seek alternative solutions.

- GALLIA has sent out tenders for the development of software and cites the lack of suitable translation and commun cation packages as a major factor hindering the development of the project.

- In Germany, there is a lack of suitable microcomputer software. The Dutch components supplier, Philips, has developed its own translation software, Cops, which it offers free externally. Ford is using the RVS software originally developed by Volkswagen, and Spanish needs are being serviced by the software house Endl.

- It is anticipated that organisations currently using EDI in the automobile sector will move towards volume implementation by 1988. This development is leveraged by clear commerical benefits. For example, in the U.K., the majority of electronic invoices are cleared within the week as against an industry average of three weeks. This leads to savings of between 0.5 and 1% of a company's annual turnover. In France, Renault estimates that EDI will lead to cost savings of $14 million per annum.

- Success of the current trials will also encourage the integration of smaller suppliers and gradual movement towards the achievement of ODETTE's long-term objective of pan-European JIT manufacturing.

VI MARKET OPPORTUNITIES

VI MARKET OPPORTUNITIES

A. INTERNATIONAL EDI

1. THE NEED TO CHANGE

- Users interviewed by INPUT rated their need for international EDI as being generally of low importance. However, as companies seek to remain competitive in international markets, the need for international EDI grows in importance.

- Companies involved in international trade have to prepare a myriad of documents for carriers, Customs and Excise, customers, banks, insurance, trade statistics, ports, etc. An export consignment can be accompanied by over 40 different documents. In addition, much use is made of the telephone and telex to deal with queries, errors, and progress on the movement of goods and documents. These predominantly paper-based data flows are costly, slow, and error prone. This problem is very pertinent in Europe, and is compounded by a proliferation of frontiers, language barriers, and government regulations.

- An EEC study revealed that documentary costs are as high as $11 billion per annum, i.e., as much as 7% of the total value of goods traded. This compares to a cost of $8 billion per annum in the U.S., i.e., approximately $350 per shipment.

- SITPRO's survey in the U.K. conducted with the Midland Bank revealed that over 50% of document sets presented to British banks under Letter of Credit were in error. This is estimated to cost U.K. exporters as much as 60 million pounds per annum.

- The convergence and increasing acceptance of international standards, such as the UN/JEDI standard, will facilitate the development of EDI solutions to these problems. In addition, increased network connectivity sets the field for rapid expansion of international EDI.

- International EDI offers a major opportunity to vendors offering international networking capability and multinational client support. GEISCO is already actively pursuing this opportunity following the European launch of their Trade*Express product (as discussed in Chapter V, Section A, of this report).

- Several users interviewed by INPUT who have established EDI using point-to-point communications are using VANS vendors to handle international communications. Their reasons for adopting this approach can be summed up by the comments of a West German user '. . . the external service is ideal for our more exotic data traffic'.

- Although EDI is largely developing within national boundaries in the early stages, international EDI presents a major opportunity especially in country markets such as Benelux and Scandinavia where there are high concentrations of industrial activity in the import/export sectors. The growing development of multinational organisations in the U.K. is generating increased demand for cost-effective international communications.

2. REGULATORY ISSUES

- For international EDI to develop, there will need to be changes in international law to enable data exchange to move from its historical paper base with handwritten signatures to electronic messages authenticated by passwords.

- The Customs Cooperation Council and UNCITRAL (United Nations Commission on International Trade Law) have now adopted a resolution for the admissibility of computer readable records as evidence in court, which gives an invaluable lever to national legislators when reviewing current legislation.

- Data protection legislation needs review and international harmonisation in order to facilitate the development of transborder data flow. This problem is compounded by the issue of responsibility for the integrity of international data traffic.

- International EDI through a VANS vendor reduces an individual company's concerns because the vendor effectively solves these issues.

- The EEC has been active in its program of support to harmonise international regulations and remove barriers to the development of international trade. However, EDI is still impeded by disparities in Customs and Excise invoicing procedures and tax legislation, especially with regard to VAT.

- The success of the CD Project (as discussed in Chapter V, Section C.2.b) in the customs area is coupled with the acceptance of the Harmonized System Nomenclature (HS), and the Single Administrative Document will aid the drive towards elimination of paperwork at frontiers.

- However, moves towards harmonisation in the regulatory and administrative environment are constrained by the vested national interests of governments and institutions. Several vendors interviewed by INPUT stated that this political factor was a significant inhibitor in the development of international EDI.

3. PORTS AND CUSTOMS

- The increasing momentum towards the use of EDI in international trade is evidenced by the large investments being made to facilitate paper trading by the European port authorities.

- Marseilles, the second port in France and the first in the Mediterranean basin, has instigated the Protis (Procedures for the Handling of Information) project. The highly sophisticated clearance system is expected to go live in early 1988. Protis is linked to the French SOFI 2 network which allows users access to databases created from the national linkup of all customs posts.

- In the U.K., computerised clearance systems are undergoing development in Felixstowe, London, and Southampton, and the new U.K. Customs Handling of Import and Export Freight (Chief) system is likely to be operational by 1988. Chief, which will substitute the present U.K. system DEPS, will achieve nationwide coverage of imports and exports.

- Other European initiatives include the INTIS (International Telecommunications and Information System) project in Rotterdam which is currently on a trial phase. INTIS will eventually be a total harbour information system linking Rotterdam with shippers, carriers, customs, and the ports of Bremen and Hamburg via X.400 and GTDI standard communications interfaces.

- The port of Le Havre in France plans to spend over 25 million francs on a program to computerise all its services in line with developments in other major ports. It is estimated that this system, when operational, will be able to reduce cargo discharge times by about 50%. The port also intends to offer some of the information on its databases to the one million or so customers who have access through the Minitel terminal to the Transpac network.

- The European Port Data Processing Association (EVHA) is coordinating the development of an interport data communications system on behalf of 17

member ports. The system will give access to the Lloyd's database on ship characteristics and the EXIS database for dangerous substances. The system is largely EEC funded, and its eight-year development period illustrates the difficulty of pan-European cooperation.

4. BANKING AND INTERNATIONAL TRADE

- International financial institutions are closely involved with international trade through credit instruments. Increasing competition in the sector has encouraged banks to develop electronic information and funds transfer systems in order to upgrade their product offerings.

- The First National Bank of Chicago's Accelerated Trade Payments (ATP) system is the first of the banking sectors initiatives in the international trade area to be launched in Europe. Chase Manhattan is also currently actively pursuing this opportunity and is trialling a Conditional Trade Payments system in the U.S.

- First Chicago's ATP system is currently at a pilot stage of development with the first shipments being covered by ATP in October 1986. The system allows exporters to present electronic trade documents to overseas banks for payment of letters of credit therefore saving users significant interest charges and the costs associated with erroneous documentation.

- The potential ATP is currently restricted by the legal issue of bills of lading being presented by banks instead of carriers, and there will need to be legislative change in some countries to overcome this problem. In addition, no one bank is capable of providing a comprehensive international branch back-up service. This problem could be resolved through the creation of an inter-bank consortium supporting ATP services.

- First Chicago also provides their Collection Reporter service alongside the ATP system which helps their clients with outstanding receivables, giving timely information on documentary and export letters of credit collections.

- The ATP system uses GEISCO's Trade*Express service which includes advanced features such as a bulletin board for information sharing (e.g., sailing schedules and port information), electronic mail to support informal documents, and access to industry-specific information databases in addition to compliance checking, translation between the many standards used for letters of credit, and mailboxing.

- It is anticipated that further development of banking products for international trade will be via similar strategic partnerships.

B. EMERGENT COUNTRY MARKETS

- It is beyond the scope of this report to fully cover the development of EDI in countries other than the four major European markets of West Germany, France, Italy, and the U.K. This section briefly summarises some applications in other emergent country markets.

1. BENELUX

- Despite the highly regulated telecommunications environment in the Netherlands (the Steenbergen committee recommendations do not become effective until 1989), EDI is developing in a variety of sectors.

- GEISCO is operating the TRANSNET network on behalf of companies in the retail distribution chain. The system was launched after a six-month pilot stage in February 1986 and is now used by over 20 organisations. The system is based on the Transcom standards developed by the Stichtung UAC which is based on the GTDI syntax rules and elements from the UN/TDED. The Stichtung UAC also acts as distributors for SITPRO's INTERBRIDGE software.

- Other EDI developments in the Netherlands include the INTIS project (a joint venture between the PTT, the Ministry of Economic Affairs, and private shippers) for Rotterdam harbour, the customs network called SAGGITTA which will be interconnected to INTIS, and a project aimed at reducing paperwork congestion at Schipol Airport.

- The market for EDI services in Belgium is influenced by its central position in Europe:

  - The headquarters of the Commission of the European Communities (CEC).

  - The centre of European operations for large multinationals, i.e., ITT, Proctor and Gamble, 3M, etc.

  - The headquarters of SWIFT.

  - Its large and strong financial institutions, i.e., Societe Generale de Banque, Banque Brussels Lambert, Kredect Bank, etc.

- In the retail distribution sector, the industry association, ICODIF, has conducted an EDI trial operated by both IBM and GEISCO. The system is based on fixed format standards not dissimilar to those published by GENCOD in France. It is anticipated that the service will be officially launched at the beginning of 1987.

- Other Belgian EDI developments include the computerisation of document handling by the Antwerp port authority and the SADBEL automatic customs system.

2. SCANDINAVIA

- Scandinavia is a prime market for the development of EDI owing to the need for companies to reduce high labour costs and the economic dependence of the Nordic countries on international trade.

- In Finland, EDI has been used in the forest products industry since 1979, and there are currently 15 companies active in EDI, trading electronically with over 80 international trading partners.

- EDI is well established among companies involved in the Swedish retail distribution chain. The DAKOM standards first developed by the Swedish EAN Committee in 1976 are now used by 50 wholesalers and 72 suppliers. Communications are established via direct links for major trading partners and via the use of dial-up PSTN or commercial networks for smaller trading partners.

- The market for VAN EDI services could well expand in Sweden following the launch of domestic and international EDI services by Trade Data Links (TDL), who are planning a pilot with GEISCO.

- EDI development in Scandinavia has been greatly facilitated by the development of common standards based upon UN/GTDI syntax rules and the UN/TDED during the DEDIST project coordinated by the Nordipro trade facilitation bodies.

- Standards development has aided rapid development of EDI in the transportation sector. For example, the Swedish project Glygdata (coordinated by Swepro) involving major exporters, freight forwarders, and airlines has led to the development of the SWECOM-AIR standards. These standards are harmonious with standards for land and sea transportation and greatly facilitate the use of EDI for competitive advantage in international trade.

- The introduction of the TRK system is enhancing the efficiency of Swedish customs clearance and control.

3. DEVELOPING NATIONS

- Developing nations that are dependent on international trade are likely to readily accept the changes implied by the requirements of EDI. Some may seize the opportunity to leap towards 21st century technology in an attempt to redress the 'North-South' imbalance in the world's economy.

- The SENEXPORT project is developing in Senegal under the guidance of SIMPROFRANCE and aims to establish a national system for document handling based on the SETRADEX method.

- However, lack of computerisation and immature telecommunications environments mitigate against major developments in the shorter term.

4. FAR EAST

- Trading nations and communities are rife for the development of EDI. For example, in Hong Kong the Hotline project is an exciting innovation designed to link together the entire international trading community. The main advocates of Hotline are the Hong Kong Trade Facilitation Council, the Hong Kong Air Cargo Terminal, and the Hong Kong Bank. With Hong Kong documentation costs estimated at $256 million per annum, there is ample incentive for a project of this nature.

C. EMERGENT INDUSTRY MARKETS

- Although EDI is still in an introductory phase with innovative users largely going through the testing and pilot phases of development, volume implemen-

tation of EDI will appear in retail, consumer goods manufacturing, automotive, and transportation sectors. The development dynamics of EDI in these sectors have been discussed earlier in this report.

- This section concentrates on the development of EDI in the second tier of adopting industries, i.e., aerospace, chemicals, electronics, and financial services.

1. AEROSPACE

- EDI initiatives in this sector have been coordinated through the industry association the AECMA (Association Europeenne des Constructeurs de Material Aerospatial). AECMA is a joint organisation of the National Aerospace Associations of its nine European member countries.

- Among the stated objectives of the Association is to create a domestic European market for the benefit of its members. EDI is central to this objective and has developed around collaborative projects between the airframe manufacturers, e.g., the European Airbus and Tornado.

- Until 1982, standards for data communications and direct network links were developed on a project by project basis. In April 1982, the Computer Data Exchange Working Group (CDEWG) was established (reporting to the Technical and Industrial Commission of the AECMA) with the objective of establishing guidelines to facilitate EDI between partners on collaborative aircraft projects. The major trading partners are British Aerospace PLC, Aerospatial, Fokker, Saab, SABCA, Messershmitt Boldow Blohm, Dornier, and Aeritalia.

- The CDEWG has developed a data dictionary, conventions for data transmission, and guidelines for EDI on new projects and, most significantly, geometry (CAD/CAM) data exchange.

- Standards development for CAD/CAM data has been fraught with difficulty. The original IGES (Initial Graphics Exchange Specification) standard launched by the National Bureau of Standards in the U.S. proved unworkable as it only allows the exchange of a subset of drawing features and requires considerable interfacing work on behalf of the users.

- The SET (Standard d'Echange et de Transfert) standards were tested during the Airbus project from October 1984 to February 1985. This standard although adopted by AECMA is now involving into the new international ISO standard, STEP (Standard for Exchange of Product Model Data). However, it is anticipated that the STEP standard will not be available for industrial use until 1990.

- Messages have been developed for data exchange based on a subset of the UN/GTDI syntax rules covering applications such as product and parts structure and electrical wiring data. The ABC guidelines also cover the exchange of technical publications, i.e., the combination of structured text, illustrations, and numeric data.

- The aerospace industry has developed four types of EDI:

  - Exchanging files between divisions of a company.

  - With European trading partners using leased lines.

  - With suppliers (i.e., engine and equipment manufacturers) using leased lines and PSTN.

  - With customers, for example, British Aerospace exchange orders for spares, etc., on the SITA network.

- In the future it is planned to develop commercial messages and a common network which avoids the costs of duplication. This may well point to the

need to migrate towards a VANS vendor solution. In addition, they will need to harmonise the standards with the rest of manufacturing industry.

2. CHEMICALS

- EDI is beginning to develop in the European chemicals industry via the coordination of the CEFIC (Conseil Europeen des Industries Chimiques).

- Agreement was reached to establish a task force to coordinate future activities, examine methods of working, establish cooperation, and generate commitment throughout the industry at a well-attended conference in June 1986.

- The European project may well follow the model of the American CIDX project which was established in 1984 under the auspices of the Chemical Process Directors Group (CPDG).

- Ten of the 24 member companies took part in a trial exchanging ANSI purchase orders, invoices, and functional acknowledgements with customers and suppliers. The trial was completed in June 1986, and a conclusion was drawn that although the benefits were substantial, there was a lengthy learning curve for EDI implementors owing to problems with software, networks, and training.

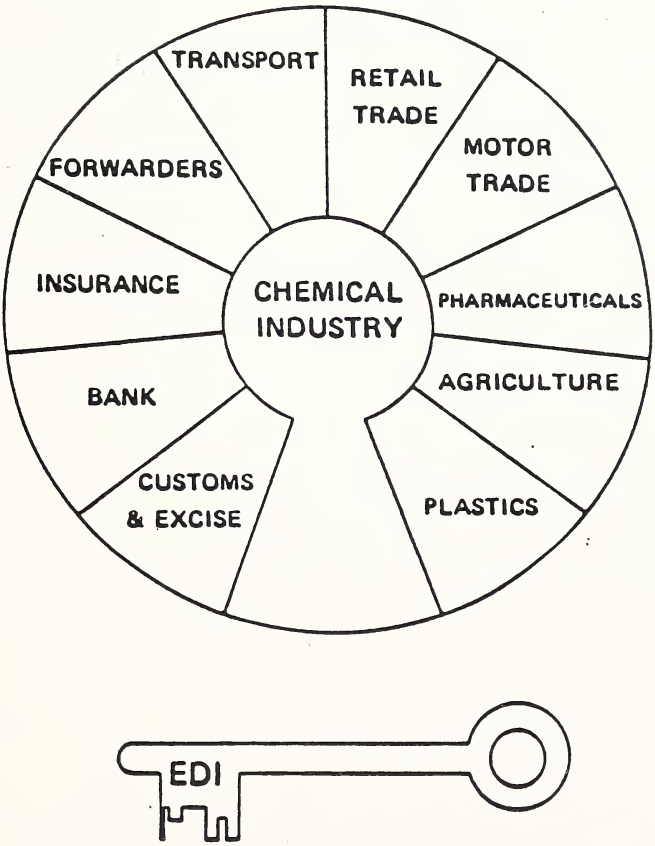
- Consequently, although individual chemical companies, particularly in the U.K. and Germany, are engaged in EDI applications and participate in the CIDX work, industry-wide implementation is unlikely to emerge before 1988.

- The international nature of the chemical industry and its links to a wide diversity of business areas may promote the adoption of the new UN/EDI standard for further development.

- The importance of EDI to the chemicals industry is illustrated in Exhibit VI-1.

EXHIBIT VI-1

EDI AND THE CHEMICAL INDUSTRY



- In addition, the industry may also follow the model adopted by ICI for developing EDI. By 1988, some 100 of ICI's customers are expected to be exchanging data electronically with the company through the Tradanet network. Tradanet will link up all of ICI's U.K. divisions. ICI Americas, a U.S. subsidiary, is currently linked via a connection with ICI's private network.

- Implementation of EDI within ICI has been greatly helped by establishing a separate corporate EDI division. The need to isolate EDI as a long-term strategic objective and develop a task force to support its implementation is an INPUT recommendation for companies evaluating its use.

3. ELECTRONICS

- In the U.S., the electronics sector has emerged as a major user of EDI technology. In Europe, there has been strong interest shown by potential participants but, as yet, a lack of coordinated action. In part, this is due to the lack of an effective industry association.

- A further problem facing companies in this sector is the lack of an established cross-industry international standard for communicating with customers in the automotive, aerospace, and retail sectors.

- However, there is currently involvement of electronics companies in the ODETTE project. Motorola and Hewlett Packard who have observer status in the working groups and Philips are major participants.

4. FINANCIAL SERVICES

- The stimuli for the rapid development of EDI within this sector are escalating costs in cash handling and management, deregulation, competition, and customer demand.

- The majority of vendors interviewed by INPUT rated this sector as a strategically important target market and also expressed an interest in linking their EDI service with financial clearinghouses, e.g., BACS (Bank Automatic Clearing System) in the U.K.

- In France, the banking sector is at the forefront of developments in the VANS area especially with the introduction of EFTPOS and 'Smart Card' in retail banking. Banking is also a major opportunity area for French EDI service vendors.

- French vendor GFI (Groupement Francais Informatique) is actively promoting their STARCOM service in this sector which provides clearinghouse facilities for banks and their corporate clients using the TRANSPAC network.

- Given that STARCOM provides mailboxing, protocol conversion, automatic reformatting, encryption, and audit trails, there is no reason why this service should not be suitable for applications in other areas, e.g., the GENCOD and GALLIA initiatives. EDI software packages, i.e., TED and TOM are also supplied by GFI for network interfacing and document translation.

- The French Inter-Banking and Telecommunications Systems Group (GSIT) which represents over 60 banks have invested heavily to upgrade its inter-bank communications systems. Future plans include the transfer of written documents, but currently the system confines itself to payment transfers.

- In the U.K., the Limenet network is being established which aims to link together the Lloyds syndicate insurance brokers for EDI applications. Future plans include links to other city markets and international financial centres.

- IBM and British Telecom (BT) are actively pursuing opportunities in the insurance sector following successful pilots of their UNIDEX (U.K. Network for Data Exchange) and MEDIAT services, respectively. Both networks provide access to the insurers' mainframes for quotations and policy enquiries.

- Although there has been no major involvement of banks in EDI projects and initiatives, it is envisaged that links between electronic funds transfer and EDI will emerge as major users move towards volume implementation.

- Strategic alliances are emerging between VANS vendors and banks. In addition, banks are actively developing opportunities to provide competitive EDI and financial information services as an aid to strengthening corporate relationships.

- In the U.S., banks are developing enhanced EDI services; for example, the First National Bank of Chicago is incorporating their ORDERNET service which provides media conversion and electronic funds transfer services for the computer hardware industry with an invoice-pay service--a long way from Pony Express.

- The Swift (Society for Worldwide Interbank Financial Telecommunications) Network is increasingly being bypassed by individual banks' proprietary networks and network services such as GEISCO. Swift's future role is to become the principal message carrier for small and medium-sized banks. An opportunity exists for VANS vendors to link their EDI services with the SWIFT network to provide an integrated service for smaller users.

D. ADDED VALUE FOR VANS VENDOR SERVICES

- By developing enhancements to existing EDI services vendors will be able to offer clear advantages to potential and existing users over the use of direct links and private networks.

- Value-added enhancements may include:

- Links between EDI systems and industry-specific interactive databases. Many vendors already host database applications. New databases could be created using industry-specific transaction statistics.

- System design to enable users to transmit at the document level rather than batch file transfer as EDI migrates towards automatically generated system-to-system messaging.

- The provision of sales forecasts and market analysis based on information transmitted through the EDI service.

- Integration of EDI service with other application services such as automated order entry linked to in-house inventory control systems. When critical supplies reach threshold levels, replacement stock is ordered.

- System design to support the exchange of CAD/CAM graphics and data between trading partners.

- The development of X.400 messaging services will allow users to adopt more comprehensive electronic communication covering informal documents as well as trade documents.

- These enhancements to VANS vendor services are necessary to ensure the development of the critical areas of transactions necessary for profitable operations. They also serve to 'lock-in' the existing customer base to a clearinghouse approach to EDI.

- Exhibit VI-2 summarises these EDI service enhancement opportunities.

EXHIBIT VI-2

ADDED VALUE FOR VANS VENDOR EDI SERVICES

- Integration with Internal Applications
- Decision Support Systems
- Industry-Specific Data Bases
- CAD/CAM
- X.400 Messaging

VII CONCLUSIONS AND RECOMMENDATIONS

VII CONCLUSIONS AND RECOMMENDATIONS

A. KEY MARKET TRENDS

- The current status of the European market for EDI can best be generalised as being in the piloting or testing phases.

- EDI is being implemented using third-party services in sectors where there are high levels of computerisation and complex trading relationships, i.e., automotive, transportation, retail distribution, and consumer goods manufacturing.

- It is envisaged that these sectors will move towards full implementation with a virtually paperless trading environment by the end of the forecast period.

- Developments in these sectors are demonstrating the potential to other sectors and smaller companies. EDI systems will become fully integrated and involve a growing number of participants in commercial trade, i.e., banks, manufacturers, carriers, insurance companies, distributors, etc.

- The expansion of EDI is dependent on the following factors:

  - Development of document standards at an application level.

  - Users realising commercial benefits of implementation.

- The progressive removal of legal constraints.
- Increased liberalisation in PTT regulations.
- Increased levels of computerisation.
- The success of specific industry projects.
- Large companies integrating smaller companies with EDI.
- Increasing awareness of EDI in embryonic markets.

- Exhibit VII-1 lists the factors driving the development of EDI.

B. RECOMMENDATIONS FOR SOFTWARE VENDORS

- It is essential that vendors develop easy to use, inexpensive microcomputer software for new EDI users. The growing acceptance of microcomputers is a key factor driving the growth of EDI services.

- Consideration must be given to the development of alliances with hardware vendors, VANS vendors, and value-added dealers and resellers (VADs and VARs) to develop micro-based turnkey EDI systems, particularly for smaller, possibly uncomputerised, users.

- Vendors should develop alliances with industry associations in order to demonstrate the ability to provide implementation support for a user community and gain their endorsement.

- Vendors must consider alliances with other software companies and professional services firms in order to strengthen sales and implementation support capability across a wide range of geographic and vertical markets.

EXHIBIT VII-1

MARKET DRIVING FACTORS

- Acceptance of Document Standards at an Application Level
- Commercial Benefits of Implementation
- Liberalisation of PTT Regulations
- Success of EDI Projects
- Large Companies Integrating Smaller Trading Partners
- Increasing Levels of Awareness

- Software vendors providing services to industries where EDI is being adopted under industry association sponsorship must target software and professional service efforts to enhance current products, i.e., to link EDI with other internal applications such as order processing, inventory control, material resource planning, and a range of decision support systems.

- Vendors must provide integrated communication links in EDI software for links to industry-specific databases and plan for electronic funds transfer components.

- Consideration must be given to the development of front ends to VANS vendor services for existing accounting packages and translation software.

- Opportunities to provide professional services must also be promoted, that is, to help EDI implementors resolve incompatibilities, convert batch-oriented to on-line systems, develop private EDI systems, and integrate networks.

- INPUT's recommendations to software vendors are shown summarised Exhibit VII-2.

C. RECOMMENDATIONS FOR VANS VENDORS

- Vendors should use EDI to keep current customers from migrating to in-house solutions or other service vendors. Vendors with expertise in specific vertical markets should explore how EDI may fit current business practices and pursue promising areas.

- Vendors must explore opportunities in industries where there is little current EDI activity and evaluate the ability to support requirements. Examples include the construction and petrochemical sectors.

SOFTWARE RECOMMENDATIONS

- Develop Micro Software
- Develop Strategic Alliances
  - VANS
  - VARs, VADs
  - Other Software Houses
- Provide Professional Services
- Integrate with Existing Applications
- Seek Industry Endorsements

- Vendors must develop strategies to maintain the existing EDI customer base through:
  - Post-implementation support.
  - Training.
  - Newsletters.
  - Sponsored seminars addressing common issues.
  - Sponsored user groups.
  - Network interlinking.
- Missionary marketing initiatives can be mounted by venodrs during the introductory stage of market development. Vendors can educate potential users on the benefits of EDI and the impact and organisational requirements for implementing EDI in operational terms.
- VANS vendors should provide full implementation support services, including professional services.
- Consideration should be given to establishing a separate division or business unit to aggregate distributed corporate strengths and focus the EDI marketing, sales, and support effort.
- Network planners should be cautious of the 'cascade effect' which will lead to exponential EDI transaction growth with volume implementation of a larger number of transaction sets. Network planners need to review capacity and project needs based on the intentions of large network users.

- Development of unconventional pricing schemes such as flat rates in order to encourage volume implementation or usage charge only schemes for small users should also be studied.

  Vendors should adopt a joint venture approach with key user organisations and software houses in order to maintain market position and provide a comprehensive range of services for key market segments.

- Target marketing efforts to end-user departments, demonstrating EDI benefits to purchasing, finance, marketing, and other departments affected by EDI implementation must also be considered. Vendors should involve data processing managers in the sales cycle to prevent hostility from those who might feel excluded from decision-making.

- Vendors must provide enhancements to existing services in order to differentiate product offerings and avoid price competition on basic generic services. Examples include the provision of gateways to interactive databases that support the requirements of trading communities.

- INPUT's recommendations to VANS vendors are shown in Exhibit VII-3.

D. A MAJOR OPPORTUNITY

- The European EDI market shows every indication of being poised for significant expansion and will emerge as a major segment of the VANS market by the 1990s.

- The U.K. market has undergone a two-year introductory phase of development and will enter a growth phase during 1987.

EXHIBIT VII-3

RECOMMENDATIONS TO VANS VENDORS

- Consider Joint Ventures and Strategic Alliances
- Focus Corporate Strengths
- Use Missionary Marketing to Build Awareness
- Develop Strategies to Lock-In Customer Base
- Provide Full Implementation Support Service
- Consider Unconvential Pricing
- Enhance Existing Services

- The French, German, and Italian markets are in a more embryonic stage of development and are not likely to experience significant growth until 1988.

- However, INPUT believes that growth in these markets will develop exponentially as user organisations seek to compete in international markets and reap the clear commercial benefits of EDI implementation.

APPENDIX A: EDI TERMINOLOGY

APPENDIX A: EDI TERMINOLOGY

- AECMA - European Association of Aerospace Manufacturers.
- AIAG - American Automobile Industry Action Group.
- ANA - Article Number Association (U.K.).
- ANSI - American National Standards Institute.
- ASC - American Standard Committee.
- ASTI - L'Association de Services Transport Infomatiques.
- BACS - U.K. Automated Clearing System.
- Batch Processing - A data processing/data communications method which groups transactions. Compare to real time processing.
- CADDIA - Project for the development of computer systems in Common Market agriculture, customs, and trade statistics.
- CCC - Customs Co-operation Council.
- CCITT - Consultative Committee on Telegraphy and Telephony.

- CCG - Article Number Association (Germany).
- CEFIC - The European Council of Chemical Manufacturers Federations.
- CIDX - U.S. project in chemical industry directed by CPDG.
- Compliance Checking - A function which verifies that document information is received in the right order and in the proper format.
- COMPROS - National Trade Facilitation Organisations of the European Communities.
- Cost 306 - An EEC EDI project in the transportation sector.
- CPDG - Chemical Process Directors Group.
- DAKCOM - Fixed format standards published by the Swedish EAN.
- DEDIST - Data Element Distribution in Trade, a Scandinavian project.
- DISH - Data Interchange for Shipping, an EDI project involving shippers, carriers, and freight forwarders.
- EAN - European Article Number Association.
- EDI - Electronic Data Interchange. The electronic exchange of business documents between companies over communications network.
- EFT - Electronic Funds Transfer.
- EFTA - European Free Trade Association.
- EFT POS - Electronic Funds Transfer at Point of Sale.

- Electronic Mail - The transmission of messages between terminals using a communications network.
- Electronic Mail Box - A store and forward facility for electronic mail messages.
- FIATA - Federation of Freight Forwarding Associations.
- Format Conversion - Transforming messages transmitted in one format to another format.
- GALLIA - French Automobile Industry Association.
- GENCOD - Article Number Association (France).
- GTDI - Guidelines for Trade Data Interchange, an international standard developed from TDI and approved by the U.N.
- IATA - International Air Transport Association.
- JEDI - Joint Electronic Data Interchange Committee.
- MAP - Manufacturing Automation Protocol from General Motors.
- ODETTE - The Organisation for Data Exchange through Teletransmission in Europe.
- OFTP - File Transfer Protocol (Odette).
- OSI - Open Systems Integration.
- POS - Point of Sale.

- Protocol Conversion - Transforming data transmitted in one protocol to another protocol.
- Real Time Processing - A data processing/data communications method with data entered and interrogated interactively.
- SAD - Single Administrative Document.
- SEDAS - Standards published by the CCG (Germany).
- SIMPRO-FRANCE - Comite Francais pour la simplification des procedures du commerce international.
- SITPRO - Simplification of International Trade Procedures Board (U.K.).
- SMMT - Society of Motor Manufacturers and Traders, the U.K. Automobile Industry Association.
- SNA - Systems Network Architecture.
- Store and Forward - The capability of a transmission or processing facility to hold messages or data until requested or until a prescheduled time.
- SWIFT - Society for Worldwide Interbank Telecommunications.
- TDCC - The Transportation Data Co-ordinating Committee.
- TDED - Trade Data Elements Directory.
- TDI - Trade Data Interchange, U.N. approved syntax rules developed by SITPRO.

- TOP - Technical and Office Protocls developed by Boeing.
- TRADACOMS - Standards endorsed by the Article Number Association which uses the United Nations Trade Data Interchange syntax.
- UNCITRAL - U.N. Commision on International Trade Law.
- UN/ECE - United Nations Economic Commission for Europe.
- VAD - Value-Added Distributor.
- VANS - Value-Added Network Services. A common carrier network transmission facility which may provide store and forward switching, compliance checking, protocol, and format conversion between a variety of host computer and terminal interfaces supporting various processing requirements.
- VAR - Value-Added Reseller.
- VASP - Value-Added Service Provider.
- VDA - Verband der Automobilindustrie.
- X.12 - A set of generic EDI standards approved by the American Standards Committee.
- X.400 - A communications protocol for interconnection between a variety of messaging systems.

APPENDIX B: ANALYSIS OF RESEARCH SAMPLE

APPENDIX B: ANALYSIS OF RESEARCH SAMPLE

- In-depth interviews (nearly all face-to-face) were conducted primarily amongst information network services vendors, PTT organisations, industry associations, and a selected number of major users.

- Telephone interviews were also conducted among a wide range of user organisations in France, Italy, West Germany, and the U.K.

- Exhibit B-1 shows the analysis of the survey respondents by category and country.

EXHIBIT B-1

ANALYSIS OF INTERVIEWS

COUNTRY	SERVICE VENDORS (Inc. PTTs)	USERS AND USER GROUPS (Face-to-Face)	GENERAL TELEPHONE SURVEY OF USERS	TOTAL
United Kingdom	10	3	40	53
West Germany	3	-	17	20
Italy	2	2	-	4
France	5	2	6	13
Total	20	7	63	90

APPENDIX C: USER QUESTIONNAIRE

APPENDIX C

ELECTRONIC DATA INTERCHANGE

USER QUESTIONAIRE

NAME OF RESPONDENT .....

POSITION .....

COMPANY NAME .....

ADDRESS .....

.....

.....

TELEPHONE NUMBER .....

DATE OF INTERVIEW .....

INTERVIEWER'S NAME .....

COUNTRY	
UK	1
FRANCE	2
WEST GERMANY	3
ITALY	4

INTRODUCTION

Ask for Data Processing/Management Information Systems Manager.

We are preparing a study on electronic data interchange, which is the electronic exchange of invoices, purchase orders, shipping documents, etc., between companies over a communications network.

Do you feel that you are the most suitable person to speak to about this type of activity within your organisation? YES/NO

If NO Could you give me the name of the person who is? GO TO INTRODUCTION

If Nobody: Who is responsible for your communications activity?
- GO TO QU:A and then QU:12

QA First of all, may I just check the number of full-time employees in your organisation?

Under 500	1	- Check Quotas
500 - 900	2	- Check Quotas
1000+	3	

QB What is the principal activity of your organisation?

Code			
	Automotive	1	- Check Quotas
	Electronics	2	
	Furniture	3	
	Other Discrete Manufacturing	4	
	Food	5	- Check Quotas
	Textiles	6	
	Other Process Manufacturing	7	
	Transportation	8	- Check Quotas
	Wholesale Distribution	9	
	Retail Distribution	10	- Check Quotas
	Banking	11	
	Insurance	12	
	Medical/Pharmaceutical	13	- Check Quotas
	Other (Write in)	0	

QU:1 Is your organisation currently using or trialling an EDI System for communicating with other companies?

Y or N

If Y When did your use of that system commence?

(Write In) _____

If N Can you estimate when your organisation will commence using an EDI system?

(Write In) _____

If no response - go to QU:13

QU:2 a) Are you using/planning to use any external service vendor to operate your EDI System? Y/N

If Y, Could you tell me which vendor(s) you use?

(Write In) _____

_____ - see list

QU:2 b) Are you using/planning to use an EDI System which utilises your own private network for communicating with other companies Y/N

If Y, Could you give me the major reasons for adopting this approach?

(Write In) _____

_____ - see list

QU:2 c) Are you using/planning to use an EDI System which utilises any other publicly available telecommunications network for communicating with other companies? Y/N

If Y, could you tell me which network(s) you use?

(Write In) _____ - see list

_____

Could you give me the major reasons for adopting this approach?

(Write In) _____

_____

QU:3 I am now going to read out a list of service elements relating to external vendor services. For each one could you please tell me whether they are very important, fairly important, not very important, or not required by your company?

	Very Important	Fairly Important	Not Very Important	Not Required	DK
Format Conversion	4	3	2	1	0
Flexible Operating Arrangements	4	3	2	1	0
Protocol Conversion	4	3	2	1	0
Comprehensive UK Network	4	3	2	1	0
Comprehensive Int. Network	4	3	2	1	0
User Training	4	3	2	1	0
Consultancy Services	4	3	2	1	0
Implementation Support	4	3	2	1	0

Are there any other important service elements which we have not considered?

Y or N

If Y : What are they?

(Write In)

QU:4 I am now going to read out a list of alternative pricing formula relating to external vendor services. Could you please indicate which one(s) you feel are most appropriate to your company's needs?

- Initial Start-up Fee and Variable Usage Charge 1
- Usage Charge Only 2
- Initial Start-up Fee and Fixed Usage Charge 3
- Payment by Sender only 4
- Payment by Sender and Receiver 5
- Don't Know 6

Other (Write In) _____

Ask only if answer to QU:2 a) was YES

QU:5 Could you please give me an indiciation of your budgeted annual expenditure on third party EDI services. Is it between £1,000 and £1,500, between £1,500 and £2,000, between £2,000 and £3,000 or greater than £3,000?

£1,000 - £1,500 1
£1,500 - £2,000 2
£2,000 - £3,000 3
Greater than £3,000 4
Don't Know 5
Other (Write In) _____

QU:5(cont'd)

What is you annual expenditure likely to be in two years time?

£1,000 - £1,500	1
£1,500 - £2,000	2
£2,000 - £3,000	3
Greater than £3,000	4
Don't Know	5
Other (Write In)	_____

QU:6 Are you looking, or would look to involve your company with an Industry Association and/or Government Body with regard to EDI? Y/N

If Y, What Organisation(s) ?

(Write In) _____

_____ - see list

QU:7 What do you think are the three most important benefits of EDI to your company?

(Write In) 1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

QU:8 I am now going to read out a variety of potentially important issues concerning the implementation of EDI systems. Could you please describe how your organisation is currently/potentially resolving them?

a) Standards (Documents/Protocols)

b) International Communications

c) Communications with Large Trading Partners

d) Communications with Small Trading Partners

e) Software Development

Are there any other important issues which we have not considered?

Y or N

If Y, What ar they?

(Write In) _____

QU:9 What do your think are the three most important factors that will ensure success in the implementation of an EDI System?

(Write In) 1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

QU:10 a) Could you please estimate the volume of transactions documents handled by your company for the following transactions?

Invoices	_____	Indicate per day/week/month
Purchase Orders	_____	
Delivery Notes	_____	
Other (Write In)	_____	
Total	_____	

QU:10 b) Could you please estimate the percentage breakdown of these volumes by the following distribution methods?

Paper	_____
Electronic Media eg. Diskette and Magnetic Tape	_____
EDI	_____

QU:10 c) Could you please indicate what percentage will be handled by EDI in two years time?

(Write In) _____

QU:11 Could you please give me an indication of the level of cost saving you expect to achieve from implementing an EDI system. Is it less than 10%, between 10% and 20%, between 20% and 30%, or greater than 30%?

Less than 10%	1
10% - 20%	2
20% - 30%	3
Greater than 30%	4
Don't Know	5
Other (Write In)	_____

QU:12 (Finally,) Could you please tell me if your company is using or planning to use the following systems for business communications. If you are planning to use the system named, could you please estimate when it will become operational?

System	Use	Planned Implementation Date
Internal Electronic Mail	_____	_____
External Electronic Mail delivered via a:		
- private network	_____	_____
- public network	_____	_____
- value added network	_____	_____
Electronic Mail using pre-formatted online forms, e.g., order blanks	_____	_____
Teletex	_____	_____
X.400	_____	_____
Electronic Funds Transfer	_____	_____
Videotex	_____	_____

QU:13 ASK ONLY IF QU:1 to QU:11 NOT COMPLETED FOR THIS RESPONDENT

As I previously mentioned, we are primarily interested in your usage of systems for electronic data interchange or EDI.

Could you please tell me whether you are very familiar with EDI, fairly familiar, not very familiar, or whether you have never heard of EDI before?

Very Familiar	4	Go To Qu:1
Fairly Familiar	3	Go to QU:1
Not Very Familiar	2	
Never Heard of EDI before	1	THANK and CLOSE

QU:14 EDI Services are provided by value-added networks (VANs). Were you aware of this? Y or N

QU:15 I am now going to read out a list of potential reasons that might have prevented your organisation from evaluting the use of EDI Systems. For each one could you tell me whether it is very important, fairly important, not very important, or irrelevant?

	Very Important	Fairly Important	Not Very Important	Irrelevant	DK
Low volume of transactions	4	3	2	1	0
Cost Justification	4	3	2	1	0
Lack of Awareness	4	3	2	1	0
Lack of Support from an Industry Association	4	3	2	1	0
Lack of Common Standards	4	3	2	1	0
Difficulties in cooperating with competitors	4	3	2	1	0
Lack of Management Support	4	3	2	1	0
Employee Relations	4	3	2	1	0
Resistance to Technological Change in Company	4	3	2	1	0
Resistance to change in traditional buyer/supplier relationships	4	3	2	1	0

Are there any other reasons which we have not covered? Y or No

If Y: What are they?

(Write In)_____

QU:16 Can you estimate when, if ever, you would start implementing an EDI System?

(Write In)_____

THANK FOR CO-OPERATION AND CLOSE

APPENDIX D: VENDOR QUESTIONNAIRE

ELECTRONIC DATA INTERCHANGE

Vendor Questionnaire

Name of Respondent .....

Position .....

Company Name .....

Address .....

.....

.....

Telephone Number .....

Date of Interview .....

Interviewer's Name .....

Country	
UK	1
France	2
West Germany	3
Italy	4

QU:1 Could you please describe your Company's service for EDI users?

Prompts

(i) History of Development:

_____

_____

_____

_____

(ii) Product/Service Offering:

_____

_____

_____

_____

(iii) Documents Supported - Current and Future:

_____

_____

_____

_____

(iv)Pricing - Average Transaction Cost (Range):

_____

_____

_____

- Tariff Structure (Small/Large User):

_____

_____

_____

QU:1 (contd.)

(v) Standards Supported:

_____

_____

_____

_____

(vi) Mailbox Facility - EDI Link/Feature
- Advantages:

_____

_____

_____

_____

(vii) Security:

_____

_____

_____

_____

(viii) Level of Investment (Incremental)
- Software
- Network
- Personnel

_____

_____

_____

_____

QU:2 What are the target markets for your service?

Prompts

Geographic UK/France/Italy/W. Germany/North America/ROW

Vertical Market

Retail
Automotive
Shipping
Other Transport
Electronics
Pharmaceutical
Aerospace
Medical
Banking
Insurance
Public Utilities
Other

QU:3 What do you consider to be the most significant factors that will influence (inhibit) the development (or potential development) of EDI services in each target vertical/country market? Please give high/medium/low impact rating.

Factors	Markets
User Awareness	
Pricing	
Ind. Associations	
Standards	
PTT Regulations	
Technology	
Marketing	

QU:4 How important are multinational communications to your future plans? Are there any special political, technical, legal, or other problems with regards to international EDI?

_____

_____

_____

_____

_____

_____

_____

QU:5 Have you entered into any commercial partnerships in order to develop and market your service? How will this change in the future?

Prompt

Industry Associations _____

Telecommunications Companies _____

Agents _____

Distributors _____

Joint ventures with other vendors _____

QU:6 Do you have or forsee the need to interface your EDI service with other services?

Prompts

Electronic Mail _____

Videotex _____

EFT _____

EFT-POS _____

Other networks?

Prompts

Other Commerical Networks

Public Networks

Private Networks

QU:7 a) What are your users/prospective users principal concerns when implementing/evaluating an EDI System?

Prompt

Cost Justification _____

Data Security _____

Standards and Compatability _____

International Communication _____

Reliance on Single Vendor _____

Service Operating Requirements _____

Implementation Support _____

Development Lead Times _____

Other _____

QU:7 (b) Which of the following human and general organisational factors are of concern to your users?

Prompt

Senior Management Support _____

Relationships with competitors _____

Employee Relations _____

Attitude to technological change _____

Attitude towards change in traditional buyer/supplier relationships _____

Other _____

QU:8 What do you think are the three most important factors that will ensure success in the development of an EDI service?

1. _____

_____

2. _____

_____

3. _____

_____

QU:9 What do you consider to be the most significant benefits of EDI systems to your users?

Prompt

Improved Customer Service
Cost Reduction
Improved Productivity
Improved Cash Flow
Improved Inventory Control
Time Saving
Improved Business Relationships
Other

QU:10 What level of EDI Service revenue growth are you now experiencing or planning for over the next five years?

_____

_____

_____

_____

QU:11 How large do you think the market is currently (1986) and will be by 1991?

Current Market Size _____

Market Size in 1991 _____

QU:12 What revenues are you generating from EDI services and what is the breakdown by market?

Market	Revenue Generated
_____	_____
_____	_____
_____	_____
_____	_____

QU:13 Who would you describe as your principal competitors in each market segment? Please rank in order of importance and estimate their market share?

Market	Competitors	Ranking	Market Share

QU:14 What in your opinion will be the likely product life cycle for EDI services?

Prompts

Length
Profitability - Pay Back Period
Pricing Methods
R & D

QU:15 Are there any other issues relating to EDI that have not been discussed?

QU:16 Can you recommend any customers that we might contact for our survey?

_____

_____

_____

_____

APPENDIX E: LIST OF RELATED INPUT REPORTS

APPENDIX E: LIST OF RELATED INPUT REPORTS

- Electronic Data Interchange (U.S. market), 1985.
- European Value-Added Network Service Opportunities, 1985-1990.
- European Videotex Market Opportunities, 1985-1990.
- Check Guarantee and Credit Card Authorisation Services (U.S. market), 1985.
- Major Western European Markets for Information Services, 1985-1990.